

L9 ANSWER 1 OF 10 USPATFULL
AN 1999:163602 USPATFULL
TI Process to improve adhesion of cap layers in integrated circuits
IN Annapragada, Rao V., San Jose, CA, United States
PA VLSI Technology, Inc., San Jose, CA, United States (U.S. corporation)
PI US 6001747 19991214
AI US 1998-120895 19980722 (9)
DT Utility
EXNAM Primary Examiner: Bowers, Charles; Assistant Examiner: Kilday, Lisa
LREP Hickman Stephens & Coleman, LLP
CLMN Number of Claims: 23
ECL Exemplary Claim: 1
DRWN 8 Drawing Figure(s); 6 Drawing Page(s)
LN.CNT 373
SUMM . . . to crack and form rifts 30. Therefore, semiconductors need an alternative material that is both a better insulator (having a **lower dielectric constant**) and which resists cracking.
SUMM . . . standard dielectric SiO₂ layer 14 in FIG. 1A to produce a methyl doped silicon oxide layer 34. Adding methyl groups lowers the dielectric constant of the methyl doped silicon oxide layer 34 to about 2.8. The methyl groups, which are added with a solvent. . .
SUMM In view of the foregoing, it is desirable to have a method that provides for a **low dielectric constant, low** -cracking insulating material that adheres well to the cap layer all in the same semiconductor apparatus without adding significant time or. .
SUMM . . . a cap layer. Methyl doped silicon oxide material is an improvement over a standard dielectric material because it has a **lower dielectric constant**. Furthermore, methyl doped silicon oxide material can also be made much thicker than normal dielectric material because it resists cracking.. .
DETD . . . hydrogen peroxide (H₂O₂) 44 which condense on top of the metal layer 40 in what is known as the Flowfill process. The methyl doped silicon oxide layer thickness t₃ is generally at least about 3,000 Angstroms. Preferably, the methyl doped. . .

L9 ANSWER 2 OF 10 USPATFULL
AN 1999:146469 USPATFULL
TI Method of depositing silicon oxides
IN Sandhu, Gurtej S., Boise, ID, United States
Iyer, Ravi, Boise, ID, United States
PA Micron Technology, Inc., Boise, ID, United States (U.S. corporation)
PI US 5985770 19991116
AI US 1997-915987 19970821 (8)
DT Utility
EXNAM Primary Examiner: Bowers, Charles; Assistant Examiner: Nguyen, Thanh
LREP Wells, St. John, Roberts, Gregory & Matkin, P.S.
CLMN Number of Claims: 11
ECL Exemplary Claim: 1
DRWN No Drawings
LN.CNT 245
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
SUMM One known way of achieving desired **lower dielectric constant** silicon oxides, such as silicon dioxide, is to provide

suitable dopant atoms within the material. Fluorine is but one example,.

SUMM . . . having high aspect ratio topography, has been developed by Electrotech Limited of Bristol, U.K., and is referred to as a **Flowfill.TM.** technology. In such process, SiH.sub.4 and H.sub.2 O.sub.2 are separately introduced into a CVD chamber, such as a parallel plate. . . .

L9 ANSWER 3 OF 10 USPATFULL

AN 1999:137782 USPATFULL

TI Multi-level conductive structure including low capacitance material

IN Tobben, Dirk, Fishkill, NY, United States

PA Weigand, Peter, Unterhaching, Germany, Federal Republic of

PA Siemens Aktiengesellschaft, Munich, Germany, Federal Republic of (non-U.S. corporation)

PI US 5977635 19991102

AI US 1997-939208 19970929 (8)

DT Utility

EXNAM Primary Examiner: Kelley, Nathan K.

LREP Braden, Stanton C.

CLMN Number of Claims: 17

ECL Exemplary Claim: 1

DRWN 10 Drawing Figure(s); 4 Drawing Page(s)

LN.CNT 534

AB . . . method includes depositing a low capacitance material 908 into the trench. The low capacitance material represents a material having a **dielectric constant lower than a dielectric constant of the first dielectric layer.**

SUMM . . . conductive layer and at least substantially through the first dielectric layer. The low capacitance material represents a material having a **dielectric constant lower than a dielectric constant of the first dielectric layer.**

SUMM . . . the method includes depositing a low capacitance material into the trench. The low capacitance material represents a material having a **dielectric constant lower than a dielectric constant of the first dielectric layer.**

DETD Although it may be desired, in some cases, to replace much of the high capacitance dielectric material with the **low-K fill** (i.e., to etch substantially through the dielectric layer), the exact depth of the trenches is determined, in part, by. . . .

DETD As the term is used herein, a low capacitance dielectric material represents a material having a **lower dielectric constant** than the material it replaces, e.g., lower than the dielectric material of dielectric layer 112 or the nitride material in. . . . has a dielectric constant in the range below about 3. In one embodiment, the low capacitance material is preferably a **low dielectric constant (low K)**

spin-on material such as hydrogen silsesquioxane SOG (e.g., Dow Corning's Fox.RTM.), methyl silsesquioxane SOG, organic spin-on polymers

(including polyimides, polybenzoxazoles, polyarylethers, or the like), and even spin-on aerogels. A self-leveling chemical vapor deposition (CVD) film (e.g., Trikon Technologies's **low-K**

Flowfill.RTM.) may also be used in accordance with yet another embodiment of the invention.

DETD . . . 112. Even if the prior art trenches (which do not substantially

extend into the dielectric layer) are filled with a **low K** material, as is done in some prior art structures (i.e., even if the trenches between conductive lines 503/505 and conductive lines 505/508 of prior art FIG. 4 are filled with a **low K** material), this approach still does not address the fact that field lines between prior art conductive plugs 303 and 305. . . .

CLM What is claimed is:
 . . . plug and said second conductive plug to reduce capacitive coupling therebetween, said low capacitance material representing a material having a **dielectric constant lower** than a **dielectric constant** of said first dielectric layer, wherein said first conductive plug is isolated from said low capacitance

material by first dielectric. . . .

9. The multi-level conductive structure of claim 8 wherein said **dielectric constant** of said low capacitance material is **lower** than a **dielectric constant** of said nitride layer.

. . . plug and said second metal plug to reduce capacitive coupling therebetween, said low capacitance material representing a material having a **dielectric constant lower** than a **dielectric constant** of said first dielectric layer, wherein said first conductive plug is isolated from said low capacitance

material by first dielectric. . . .

11. The dynamic random access memory circuit of claim 10 wherein said **dielectric constant** of said low capacitance material is below about 3.

. . . 15. The dynamic random access memory circuit of claim 14 wherein said

second dielectric layer represents a nitride layer, said **dielectric constant** of said low capacitance material is **lower** than a **dielectric constant** of said nitride layer.

L9 ANSWER 4 OF 10 USPATFULL

AN 1999:122736 USPATFULL

TI Method of planarizing the semiconductor structure

IN Ilg, Matthias, Fishkill, NY, United States

Tobben, Dirk, Fishkill, NY, United States

Weigand, Peter, Croton on Hudson, NY, United States

PA Siemens Aktiengesellschaft, Munich, Germany, Federal Republic of (non-U.S. corporation)

PI US 5963837 19991005

AI US 1997-846924 19970430 (8)

DT Utility

EXNAM Primary Examiner: Chaudhari, Chandra; Assistant Examiner: Nguyn, Thanh

LREP Braden, Stanton C.

CLMN Number of Claims: 14

ECL Exemplary Claim: 1

DRWN 4 Drawing Figure(s); 2 Drawing Page(s)

LN.CNT 317

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

SUMM . . . i.e., relatively flat. Thus, it is necessary to fill these gaps

width a suitable material, preferably a material with a low **dielectric constant** to prevent coupling between the adjacent electrodes and provide a planar surface over both the high and low aspect ratio. . . .

SUMM . . . i.e., the first portion of the gap filling material, being substantially free of such contaminants and dopant, has a relatively low **dielectric constant** thereby reducing electrical coupling between adjacent electrodes.

DETD . . . further, the dielectric constant of the material filling the gaps 28, being substantially free of such contaminants, has a relatively

low **dielectric constant** (i.e., in the order of 3.0 to 3.8) thereby reducing electrical coupling between adjacent

gate electrodes.
DETD . . . described above instead of using such spin deposited process.
One such material which may be used with gaseous deposition is
Flowfill material sold by PMT-Electrotech, Chatsworth, Calif.
Still further, the process may be used to fill gaps other than gaps
between. . .

L9 ANSWER 5 OF 10 INSPEC COPYRIGHT 2000 IEE
AN 2000:6492123 INSPEC DN B2000-03-2550E-045
TI A selective CMP process for stacked **low-k** CVD oxide
films.
AU Hartmannsgruber, E.; Zwicker, G. (Fraunhofer-Inst. fur Siliziumtechnol.,
Itzehoe, Germany); Beekmann, K.
SO Microelectronic Engineering (Jan. 2000) vol.50, no.1-4, p.53-8. 5 refs.
Doc. No.: S0167-9317(99)00264-6
Published by: Elsevier
Price: CCCC 0167-9317/2000/\$20.00
CODEN: MIENEF ISSN: 0167-9317
SICI: 0167-9317(200001)50:1/4L:53:SPSO;1-6
Conference: Third European Workshop on Materials for Advanced
Metallization. Ostende, Belgium, 7-10 March 1999
DT Conference Article; Journal
TC Practical
CY Netherlands
LA English
TI A selective CMP process for stacked **low-k** CVD oxide
films.
AB A chemical mechanical polishing process for a stacked **low-**
k dielectric material, which is suitable for inter-metal
dielectric applications, has been developed. The dielectric is deposited
by CVD and composed of a methyl-doped silicon oxide (i.e., **low-**
k Flowfill) embedded between thin SiO₂ layers. A new CMP
parameter is introduced, which is the removal rate selectivity between
two
different kinds of materials. We were able to adjust the selectivity
between cap and **low-k Flowfill** layer in a
range between 3:1 and 1:5 by tuning the slurry mixture. Different test
structures were used to investigate. . . effect of the removal rate
selectivity on the planarisation efficiency of the CMP process. A higher
removal rate of the **low-k Flowfill** layer in
comparison to that of the cap layer results in a significant increase
of the planarisation length and a reduction. . .
ST selective CMP process; **stacked low-k CVD oxide films**; chemical
mechanical polishing process; inter-metal dielectric applications;
methyl-doped silicon oxide; **low-k Flowfill**; removal rate
selectivity; slurry mixture; planarisation efficiency; cap layer;
overpolish; planarity; SiO₂

L9 ANSWER 6 OF 10 INSPEC COPYRIGHT 2000 IEE
AN 1999:6368334 INSPEC DN B1999-11-2550F-010
TI CVD **low-k** for gap fill and planarisation.
AU McClatchie, S.; Beekmann, K.; Kiermasz, A. (Trikon Technol., UK)
SO European Semiconductor (Aug. 1999) vol.21, no.8, p.32-3. 6 refs.
Published by: Angel Publishing
CODEN: EUSEEK ISSN: 0265-6027
SICI: 0265-6027(199908)21:8L:32:FP;1-0
DT Journal
TC Practical; Experimental
CY United Kingdom
LA English
TI CVD **low-k** for gap fill and planarisation.
AB. . . inter-level dielectric has begun to directly contribute to IC delay
times. This has led the industry to search for new **low-k**
materials to replace SiO₂. This article describes one approach, a
silicon-based film called **Low k Flowfill**.

Using its **Flowfill** CVD process, Trikon Technologies has demonstrated gap fill and planarisation of $k=2.7$ dielectric material and integration into 0.25-0.18 μ m.

ST CVD low-k ILD; gap fill; planarisation; silicon dioxide; VLSI interlayer dielectric applications; ULSI interlayer dielectric applications; metal interconnects; isolation; dielectric constant; device geometries; packing density; operating speed; inter-level dielectric; IC delay times; low-k dielectric materials; silicon-based Low k Flowfill film; Flowfill CVD process; dielectric material; dielectric material integration; aluminium subtractive etch interconnects;
0.18 to 0.25 micron; Al; SiO₂

L9 ANSWER 7 OF 10 EUROPATFULL COPYRIGHT 2000 WILA

PATENT APPLICATION - PATENTANMELDUNG - DEMANDE DE BREVET

AN 960958 EUROPATFULL ED 19991212 EW 199948 FS OS
TIEN Method for producing hydrogenated silicon oxycarbide films.
TIDE Verfahren zur Herstellung von hydriertem Silizium-Oxy-Karbid.
TIFR Procède pour la preparation de silicium-oxy-carbure hydrogene.
IN Loboda, Mark Jon, 1902 Vine Street, Midland, Michigan 48640, US;
Seifferly, Jeffrey Alan, 3007 Linden Park Drive, Bay City, Michigan 48706, US
PA DOW CORNING CORPORATION, 3901 S. Saginaw Road, Midland Michigan 48686-0994, US
PAN 275274
AG Patentanwaelte Sternagel & Fleischer, Braunsberger Feld 29, 51429 Bergisch Gladbach, DE
AGN 101441
OS ESP1999088 EP 0960958 A2 991201
SO Wila-EPZ-1999-H48-T1a
DT Patent
LA Anmeldung in Englisch; Veroeffentlichung in Englisch.
DS R AT; R BE; R CH; R CY; R DE; R DK; R ES; R FI; R FR; R GB; R GR; R IE; R IT; R LI; R LU; R MC; R NL; R PT; R SE; R AL; R LT; R LV; R MK; R RO; R SI
PIT EPA2 EUROPAEISCHE PATENTANMELDUNG
PI EP 960958 A2 19991201
OD 19991201
AI EP 1999-110260 19990527
PRAI US 1998-86811 19980529

ABEN This invention is a method for producing hydrogenated silicon oxycarbide
(H:SiOC) films having a **low dielectric constant**. This method comprises reacting an methyl-containing silane in a controlled oxygen environment using plasma enhanced or ozone assisted chemical vapor.

DETDEN. . . have high dielectric constants (i.e. 3.8 or greater). Therefore there is a need for processes and materials that result in **low dielectric constant** films. A new deposition processes known as **Low-k Flowfill**.reg., produces films having a dielectric constant of <3.0 . This method uses a chemical vapor deposition reaction between methylsilane and hydrogen peroxide to produce a methyl doped silicon oxide film (See S. McClatchie, K. Beekmann, A. Kiermasz; **Low Dielectric Constant** Oxide Films Deposited Using CVD Techniques, 1988 DUMIC Conference Proceedings, 2/98, p. 311-318). However, this process requires a non standard. . .
An object of this invention is to provide a method for producing **low dielectric constant** thin films of hydrogenated silicon oxycarbide by chemical vapor deposition. This invention pertains to a method of producing thin films of hydrogenated silicon oxycarbide (H:SiOC) having **low**

dielectric constants on substrates, preferably semiconductor devices. The method comprises the plasma enhanced or

ozone

enhanced chemical vapor deposition of a reaction. . .

The films produced, due to the **low dielectric constant**, are particularly suited as interlayer dielectrics in semiconductor integrated circuit manufacturing—such as gate

dielectrics,

premetal and intermetal dielectrics and. . .

L9 ANSWER 8 OF 10 EUROPATFULL COPYRIGHT 2000 WILA

PATENT APPLICATION - PATENTANMELDUNG - DEMANDE DE BREVET

AN 905778 EUROPATFULL ED 19990411 EW 199913 FS OS
TIEN Improved multi-level conductive structure and methods therefor.
TIDE Verbesserte Mehrlagenleitungsstruktur und Verfahren dafuer.
TIFR Structure conductrice ameliorée a plusieurs niveaux et procede de fabrication.
IN Tobben, Dirk, 12 Bayberry Circle, Fishkill, NY 12524, US;
Weigand, Peter, Rathausplatz 2, 82008 Unterhaching, DE
PA SIEMENS AKTIENGESELLSCHAFT, Wittelsbacherplatz 2, 80333 Muenchen, DE
PAN 200520
AG Patentanwaelte Westphal, Mussnug & Partner, Waldstrasse 33, 78048 Villingen-Schwenningen, DE
AGN 100411
OS ESP1999025 EP 0905778 A2 990331
SO Wila-EPZ-1999-H13-T2b
DT Patent
LA Anmeldung in Englisch; Veroeffentlichung in Englisch
DS R AT; R BE; R CH; R CY; R DE; R DK; R ES; R FI; R FR; R GB; R GR; R IE; R IT; R LI; R LU; R MC; R NL; R PT; R SE
PIT EPA2 EUROPAEISCHE PATENTANMELDUNG
PI EP 905778 A2 19990331
OD 19990331
AI EP 1998-116755 19980904
PRAI US 1997-939208 19970929
ABEN. . . method includes depositing a low capacitance material 908 into

the

trench. The low capacitance material represents a material having a **dielectric constant lower** than a **dielectric constant** of the first dielectric layer.

DET DEN. . . conductive layer and at least substantially through the first dielectric layer. The low capacitance material represents a material having a **dielectric constant lower** than a **dielectric constant** of the first dielectric layer.

In . . . the method includes depositing a low capacitance material into the trench. The low capacitance material represents a material having a **dielectric constant lower** than a **dielectric constant** of the first dielectric layer.

Although it may be desired, in some cases, to replace much of the high capacitance dielectric material with the **low-K** fill (i.e., to etch substantially through the dielectric layer), the exact depth of the trenches is determined, in part, by. . .

As the term is used herein, a low capacitance dielectric material represents a material having a **lower dielectric**

constant than the material it replaces, e.g., lower than the dielectric material of dielectric layer 112 or the nitride material in. . . has a dielectric constant in the range below about 3. In one embodiment, the low capacitance material is preferably a **low dielectric constant (low K)**

spin-on material such as hydrogen silsesquioxane SOG (e.g., Dow Corning's Fox.reg.), methyl silsesquioxane SOG, organic spin-on polymers

(including polyimides, polybenzoxazoles, polyarylethers, or the like),

and even spin-on aerogels. A self-leveling chemical vapor deposition (CVD) film (e.g., Trikon Technologies's low-K Flowfill.reg.) may also be used in accordance with yet another embodiment of the invention.

Further, . . . 112. Even if the prior art trenches (which do not substantially extend into the dielectric layer) are filled with a low K material, as is done in some prior art structures (i.e., even if the trenches between conductive lines 503/505 and conductive lines 505/508 of prior art Fig. 4 are filled with a low K material), this approach still does not address the fact that field lines between prior art conductive plugs 303 and 305.

CLMEN. . . conductive layer and at least substantially through said first dielectric layer, said low capacitance material representing a material having a dielectric constant lower than a dielectric constant of said first dielectric layer.

9. The multi-level conductive structure of claim 8 wherein said dielectric constant of said low capacitance material is lower than a dielectric constant of said first nitride layer.

10. . . metal layer and at least substantially through said first dielectric layer, said low capacitance material representing a material having a dielectric constant lower than a dielectric constant of said first dielectric layer.

11. The dynamic random access memory circuit of claim 10 wherein said dielectric constant of said low capacitance material is below about 3.

15. The dynamic random access memory circuit of claim 14 wherein said second dielectric layer represents a nitride layer, said dielectric constant of said low capacitance material is lower than a dielectric constant of said nitride layer.

16. . . layer; and depositing a low capacitance material into said trench, said low capacitance material representing a material having a dielectric constant lower than a dielectric constant of said first dielectric layer.

22. The method of claim 21 wherein said dielectric constant of said low capacitance material is lower than a dielectric constant of said first nitride layer.

L9 ANSWER 9 OF 10 EUROPATFULL COPYRIGHT 2000 WILA

PATENT APPLICATION - PATENTANMELDUNG - DEMANDE DE BREVET

AN 875930 EUROPATFULL ED 19981115 EW 199845 FS OS
TIEN Planarization of an interconnection structure.
TIDE Planarisierung einer Leiterbahnstruktur.
TIFR Planarisation d'une structure d'interconnexion.
IN Ilg, Matthias, 4 North Mulberry Street, Richmond, VA 23220, US;
Tobben, Dirk, 12 Bayberry Circle, Fishkill, NY 12524, US;
Weigand, Peter, Rathausplatz 2, 82008 Unterhaching, DE
PA SIEMENS AKTIENGESELLSCHAFT, Wittelsbacherplatz 2, 80333 Muenchen, DE
PAN 200520
AG PatentanwaelteWestphal, Buchner, MussnugNeunert, Goehring, Waldstrasse
33, 78048 Villingen-Schwenningen, DE
AGN 100411
OS ESP1998078 EP 0875930 A2 981104
SO Wila-EPZ-1998-H45-T2b
DT Patent
LA Anmeldung in Englisch; Veroeffentlichung in Englisch
DS R AT; R BE; R CH; R DE; R DK; R ES; R FI; R FR; R GB; R GR; R IE; R IT;
R LI; R LU; R MC; R NL; R PT; R SE
PIT EPA2 EUROPAEISCHE PATENTANMELDUNG

PI EP 875930 A2 19981104
OD 19981104
AI EP 1998-105151 19980321
PRAI US 1997-846924 19970430

DETDEN. . . i.e., relatively flat. Thus, it is necessary to fill these gaps width a suitable material, preferably a material with a low

dielectric constant to prevent coupling between the

adjacent electrodes and provide a planar surface over both the high and low aspect ratio. . . .

The . . . i.e., the first portion of the gap filling material, being substantially free of such contaminants and dopant, has a relatively

low dielectric constant thereby reducing electrical coupling between adjacent electrodes.

Thus, . . . further, the dielectric constant of the material filing the gaps 28, being substantially free of such contaminants, has a relatively **low dielectric constant** (i.e., in the order of 3.0 to 3.8) thereby reducing electrical coupling

between

adjacent gate electrodes.

Other . . . described above instead of using such spin deposited process. One such material which may be used with gaseous deposition is

Flowfill material sold by PMT-Electrotech, Chatsworth, CA. Still further, the process may be used to fill gaps other than gaps between.

L9 ANSWER 10 OF 10 EUROPATFULL COPYRIGHT 2000 WILA

PATENT APPLICATION - PATENTANMELDUNG - DEMANDE DE BREVET

AN 875929 EUROPATFULL ED 19981115 EW 199845 FS OS

TIEN Planarisation of an interconnect structure.

TIDE Planarisierung einer Leiterbahnstruktur.

TIFR Planarisation d'une structure d'interconnexion.

IN Ilg, Matthias, 4 North Mulberry Street, Richmond, VA 23220, US;

Tobben, Dirk, 12 Bayberry Circle, Fishkill, NY 12524, US;

Weigand, Peter, Rathausplatz 2, 82008 Unterhaching, DE

PA SIEMENS AKTIENGESSELLSCHAFT, Wittelsbacherplatz 2, 80333 Muenchen, DE

PAN 200520

AG PatentanwaelteWestphal, Buchner, MussgnugNeunert, Goehring, Waldstrasse 33, 78048 Villingen-Schwenningen, DE

AGN 100411

OS ESP1998078 EP 0875929 A2 981104

SO Wila-EPZ-1998-H45-T2b

DT Patent

LA Anmeldung in Englisch; Veroeffentlichung in Englisch

DS R AT; R BE; R CH; R DE; R DK; R ES; R FI; R FR; R GB; R GR; R IE; R IT;

R LI; R LU; R MC; R NL; R PT; R SE

PIT EPA2 EUROPAEISCHE PATENTANMELDUNG

PI EP 875929 A2 19981104

OD 19981104

AI EP 1998-105150 19980321

PRAI US 1997-846925 19970430

ABEN. . . the gaps, i.e., the first portion of the gap filling material, being substantially free of such contaminants, has a relatively

low dielectric constant thereby reducing electrical coupling between adjacent electrodes. The self-planarizing material is a flowable material. The flowable oxide may be spun. . . .

DETDEN. . . adjacent pair thereof. Thus, it is necessary to fill these gaps width a suitable material, preferably a material with a low

dielectric constant to prevent coupling between the

adjacent electrodes as well as to provide a planar surface for subsequent photolithography.

In . . . the gaps, i.e., the first portion of the gap filling material, being substantially free of such contaminants, has a

relatively low dielectric constant thereby
reducing electrical coupling between adjacent electrodes.
Thus, . . . the first, lower portion 26 of the gap filling material
24, being substantially free of such contaminants, has a relatively
low dielectric constant (i.e., in the order
of 3.6 to 4.0) thereby reducing electrical coupling between adjacent
gate electrodes.

Other . . . described above instead of using such spin deposited
process. One such material which may be used with gaseous deposition is
Flowfill material sold by PMT-Electrotech, Chatsworth, CA.

L6 ANSWER 2 OF 22 USPATFULL
AN 1999:170931 USPATFULL
TI Integrated circuit dielectric and method
IN Lu, Jiong-Ping, Dallas, TX, United States
Jin, Changming, Plano, TX, United States
PA Texas Instruments Incorporated, Dallas, TX, United States (U.S.

corporation)

PI US 6008540 19991228

AI US 1998-87458 19980528 (9)

PRAI US 1997-47794 19970528 (60)

DT Utility

EXNAM Primary Examiner: Crane, Sara; Assistant Examiner: Vu, Hung Kim

LREP Hoel, Carlton H.; Donaldson, Richard L.

CLMN Number of Claims: 2

ECL Exemplary Claim: 1

DRWN 27 Drawing Figure(s); 18 Drawing Page(s)

LN.CNT 573

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

SUMM . . . adhesion by plasma activation, ion beam shell formation, or open surface pore filling deposition and/or with reducing atmosphere sintering to **lower dielectric constant** and incorporated as a multilevel integrated circuit dielectric.

SUMM This has the advantages of manufacturable interlevel dielectrics incorporating xerogel to **lower dielectric constant**.

DETD . . . dry the xerogel at high temperatures (e.g., 450.degree. C.) in a reducing atmosphere (e.g., forming gas or hydrogen) to achieve **low dielectric constant**.

DETD . . . relative pore volume in the gaps may be higher than the relative pore volume above the interconnects, and thus the **dielectric constant may be lower** in the gaps than above the interconnects.

DETD --Si(CH₃)₃+O₂.fwdarw.--SiO₂+CO₂+H₂O

DETD . . . nm oxide liner on the interconnects (see liner 140 in FIG. 1d) could be replaced by other dielectric materials to **lower effective dielectric constant**. In particular, any conformally depositable material which does not react with the interconnect metal and to which xerogel will stick. . . .

L6 ANSWER 3 OF 22 USPATFULL
AN 1999:163764 USPATFULL
TI Curable compositions containing cycloolefin and filler
IN Setiabudi, Frans, Eschbach, Germany, Federal Republic of
PA Ciba Specialty Chemicals Corp., Tarrytown, NY, United States (U.S. corporation)

PI US 6001909 19991214

AI US 1996-736703 19961028 (8)

PRAI CH 1995-3108 19951102

DT Utility

EXNAM Primary Examiner: Mulcahy, Peter D.

LREP Kovaleski, Michele A.; Crichton, David R.

CLMN Number of Claims: 18

ECL Exemplary Claim: 1

DRWN No Drawings

LN.CNT 1075

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

SUMM . . . wherein X.sub.3 is --CHR.sub.16 --, oxygen or sulfur, R.sub.14 and R.sub.15 are each independently of the other hydrogen, --CN,

trifluoromethyl, (CH.sub.3).sub.3 SiO--, (CH.sub.3).sub.3 Si-- or --COOR.sub.17, and R.sub.16 and R.sub.17 are each independently of the other hydrogen, C.sub.1 -C.sub.12 alkyl, phenyl or benzyl;
SUMM . . . hydrogen, C.sub.1 -C.sub.12 alkyl, phenyl or benzyl, and R.sub.20 and R.sub.21 are each independently of the other hydrogen, CN, trifluoromethyl, (CH.sub.3).sub.3 SiO--, (CH.sub.3).sub.3 Si-- or --COOR.sub.23, and R.sub.23 is hydrogen, C.sub.1 -C.sub.12 alkyl, phenyl or benzyl;
SUMM . . . of this invention have, in particular, high heat stability, excellent toughness and mechanical solidity as well as excellent electrical properties (**low dielectric constant, low loss factor** or tan .delta. value) and are especially suitable for use in the vacuum casting technology, preferably as encapsulating. . .

L6 ANSWER 4 OF 22 USPATFULL
AN 1999:163602 USPATFULL
TI Process to improve adhesion of cap layers in integrated circuits
IN Annapragada, Rao V., San Jose, CA, United States
PA VLSI Technology, Inc., San Jose, CA, United States (U.S. corporation)
PI US 6001747 19991214
AI US 1998-120895 19980722 (9)
DT Utility
EXNAM Primary Examiner: Bowers, Charles; Assistant Examiner: Kilday, Lisa
LREP Hickman Stephens & Coleman, LLP
CLMN Number of Claims: 23
ECL Exemplary Claim: 1
DRWN 8 Drawing Figure(s); 6 Drawing Page(s)
LN.CNT 373

AB A method for making a multi-layered integrated circuit structure, includes depositing a **methyl doped silicon oxide** layer over a substrate. SiO.sub.2 skin is deposited on the **methyl doped silicon oxide** layer by decreasing the flow of CH.sub.3 SiH.sub.3, increasing the flow of SiH.sub.4 and keeping the flow of H.sub.2 O.sub.2. . .
SUMM . . . manufacturing processes, and more particularly to techniques for improving the adhesion of a cap layer to an underlayer that

includes **methyl doped silicon oxide** material that is vapor deposited.

SUMM . . . to crack and form rifts 30. Therefore, semiconductors need an alternative material that is both a better insulator (having a **lower dielectric constant**) and which resists cracking.

SUMM . . . ~~semiconductor structure~~ is to add methyl groups to the standard

dielectric SiO.sub.2 layer 14 in FIG. 1A to produce a methyl doped silicon oxide layer 34. Adding methyl groups lowers the dielectric constant of

~~the methyl doped silicon oxide layer 34 to about 2.8. The methyl groups, which are added with a solvent free operation allows a thickness t.sub.2. . .~~

SUMM . . . (CMP) process used to planarize the cap layer. This is because the cap layer 12 doesn't adhere well to the **methyl doped silicon oxide layer 34.**

SUMM In view of the foregoing, it is desirable to have a method that provides

for a **low dielectric constant, low -cracking insulating material** that adheres well to the cap layer all in the same semiconductor apparatus without adding significant time or. .

SUMM . . . invention fills these needs by providing an efficient and economical method for improving adhesion of a cap oxide to a **methyl doped silicon oxide material.** It

should be appreciated that the present invention can be implemented in numerous ways, including as a process, an.

SUMM In one embodiment, a method for making a multi-layered integrated circuit structure is disclosed. This method includes: (a) depositing a methyl doped silicon oxide layer with a first thickness over a substrate under a first set of conditions; (b) depositing a SiO₂ skin with a second thickness on the methyl doped silicon oxide layer under a second set of conditions wherein the second thickness is substantially thinner than said first thickness; and (c) depositing a cap layer adhering on the SiO₂ skin under a third set of conditions. The methyl doped silicon oxide is preferably CH₃SiO₂. In addition, the depositions are preferably performed in a same semiconductor apparatus.

SUMM . . . the volume of H₂O is held constant over a period of time to produce a SiO₂ skin over the methyl doped silicon oxide layer. The period of time is preferably in the range of about 10-20 seconds.

SUMM An advantage of the present invention is that it improves adhesion between a methyl doped silicon oxide layer and a cap layer. Methyl doped silicon oxide material is an improvement over a standard dielectric material because it has a lower dielectric constant. Furthermore, methyl doped silicon oxide material can also be made much thicker than normal dielectric material because it resists cracking. Both of these factors allow the methyl doped silicon oxide layer to reduce inter-metal capacitance in the integrated circuit.

SUMM An additional advantage of the present invention is that it improves the adhesion of the methyl doped silicon oxide layer and the cap layer with minimal additional procedures, time and expense. Formation of the SiO₂ skin can be accomplished using the same semiconductor apparatus that is used to deposit both the methyl doped silicon oxide layer and the cap layer.

SUMM . . . of the present invention requires minimal additional cost and time because it can be completed in a few seconds between methyl doped silicon oxide layer and cap layer deposition.

DRWD FIG. 1B is a cross-sectional view illustrating several layers of a prior art integrated circuit incorporating a methyl doped silicon oxide layer.

DRWD FIG. 6 is a flow chart of a method for improving adhesion of a cap layer to a methyl doped silicon oxide layer in accordance with the present invention.

DETD An invention for a method to improve adhesion of a cap layer to a methyl doped silicon oxide layer is disclosed. In the following description, numerous specific details are set forth in order to provide a thorough understanding.

DETD . . . the process, a metal layer 40 is deposited on top of a semiconductor substrate 38, and is then patterned. A methyl doped silicon oxide layer 42 is deposited on top of the metal layer 40 to act as an insulator as illustrated in FIG. 3A.

The presence of the methyl groups reduces the dielectric constant of the methyl doped silicon oxide layer 42. In addition, the methyl groups, which are added in a solvent free operation, also add crack resistant characteristics.

DETD The methyl doped silicon oxide layer 42 is deposited in a semiconductor apparatus by mixing a gaseous combination of methyl silane (CH₃SiH₃) and hydrogen. . . O₂ 44 which condense on top of the metal layer 40 in what is known as the

Flowfill process. The **methyl doped silicon oxide** layer thickness t.sub.3 is generally at least about 3,000 Angstroms. Preferably, the **methyl doped silicon oxide** layer 42 is composed of CH.sub.3 SiO.sub.x having a thickness t.sub.3 is about 3,000 to about 10,000 Angstroms where x varies from about 1.5 to about 1.9. The ~~percentage of methyl in the methyl doped silicon oxide layer 42 is about 10% to about 25%.~~

DETD . . . SiO.sub.2 skin 46. By "skin" it is meant that a thin film or layer of SiO.sub.2 is formed over the **methyl doped silicon oxide** layer 42. The integrated circuit 36 remains in the same semiconductor apparatus, which is preferably a cluster tool including a chemical vapor deposition (CVD) chamber. At

the end of the operation that deposits the **methyl doped silicon oxide** layer 42, the volume of CH.sub.3 SiH.sub.3 flowing over the integrated circuit 36 is decreased, and the volume of silane. . .

DETD . . . 46 is formed by a gaseous combination of SiH.sub.4 and H.sub.2 O.sub.2 48 which then condenses on top of the **methyl doped silicon oxide** layer 42.

DETD The CVD tool operates preferably from about 0.2 Torr to about 1.5 Torr. The **methyl doped silicon oxide** 42 should have a dielectric constant of between about 2.7 and about 3.0, and preferably a dielectric constant of 2.8. . .

DETD . . . The cap layer 49 adheres to the SiO.sub.2 skin 46 and resists peeling because the methyl groups present in the **methyl doped silicon oxide** layer 42 are buffered from the cap layer 49 by the SiO.sub.2 skin 46. After the CMP process, the cap. . .

DETD . . . flow chart encompasses a process 54 of making a semiconductor structure that improves adhesion of a cap layer to a **methyl doped silicon oxide** layer. The method 54 begins at an operation 56 where a metal layer is deposited and patterned onto the semiconductor substrate. The metal layer typically comprises of conductive metal traces. In an operation 58, a **methyl doped silicon oxide** layer is deposited onto the metal layer using chemical vapor deposition (CVD). **Methyl doped silicon oxide** material is used because it is a better insulator than the standard dielectric material and also because it resists cracking.

DETD . . . operation 62 deposits a cap layer which adheres to the SiO.sub.2 skin, thus allowing usage of methyl groups in the **methyl doped silicon oxide** layer. The **methyl** groups improve the insulating and crack resisting characteristics of the **methyl doped silicon oxide** layer.

CLM What is claimed is:

1. A method for making a multi-layered integrated circuit structure comprising: depositing a **methyl doped silicon oxide** layer with a first thickness over a substrate under a first set of conditions; depositing a SiO.sub.2 skin with a second thickness on said **methyl doped silicon oxide** layer under a second set of conditions wherein said second thickness is substantially thinner than said first thickness; and depositing. . .

. . . for making a multi-layered integrated circuit structure as recited in

claim 1 wherein said methyl group is from the group CH.sub.3 SiO.sub.x.

. . . method for making a multi-layered integrated circuit structure as recited in claim 2 wherein the value x in said group CH.sub.3 SiO.sub.x is about 1.5 to about 1.9.

13. A method for making a multi-layered integrated circuit structure as

recited in claim 1 wherein said **methyl doped silicon oxide** layer is formed over a metal layer.

15. A method for making a multi-layered integrated circuit structure as recited in claim 1 wherein said **methyl doped silicon oxide** layer is preferably at least about 3,000 Angstroms in thickness.

16. A method for making a multi-layered integrated circuit structure as recited in claim 15 wherein said **methyl doped silicon oxide** layer is preferably in the range of about 3,000-5,000 Angstroms in thickness.

22. A method for making a multi-layered integrated circuit structure as recited in claim 1 wherein said **methyl doped silicon oxide** has a dielectric constant in the range of about 2.0-3.5.

23. A method for making a multi-layered integrated circuit structure as recited in claim 22 wherein said **methyl doped silicon oxide** has a dielectric constant of about 2.8.

L6 ANSWER 5 OF 22 USPATFULL

AN 1999:163594 USPATFULL

TI Method of manufacturing a semiconductor device

IN Konishi, Nobuo, Yamanashi-ken, Japan

PA Tokyo Electron Limited, Tokyo, Japan (non-U.S. corporation)

PI US 6001739 19991214

AI US 1997-979658 19971126 (8)

PRAI JP 1996-332814 19961127

DT Utility

EXNAM Primary Examiner: Powell, William

LREP Oblon, Spivak, McClelland, Maier & Neustadt, P.C.

CLMN Number of Claims: 16

ECL Exemplary Claim: 1

DRWN 27 Drawing Figure(s); 6 Drawing Page(s)

LN.CNT 581

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB A method of manufacturing a semiconductor device comprising the steps of

forming an organic insulating film of a **low dielectric constant** on a surface of a silicon wafer, forming a photoresist film on the organic insulating film, exposing the photoresist film.

DETD Using Chemical Vapor Deposition method or spin coating method, an organic insulating film 1A of (CH.sub.3 -- SiO.sub.2).sub.n is formed on the surface of the wafer W (Step S1), as shown in FIG. 2A. The wafer W used.

L6 ANSWER 6 OF 22 USPATFULL

AN 1999:160138 USPATFULL

TI Coating solution and method for preparing the coating solution, method for forming insulating films for semiconductor devices, and method for evaluating the coating solution

IN Nakano, Tadashi, Chiba, Japan

Shimura, Makoto, Chiba, Japan

Ohta, Tomohiro, Chiba, Japan

PA Kawasaki Steel Corporation, Hyogo, Japan (non-U.S. corporation)

PI US 5998522 19991207

AI US 1998-42668 19980317 (9)

RLI Continuation of Ser. No. US 545736

PRAI JP 1994-41314 19940311

DT Utility

EXNAM Primary Examiner: Marquis, Melvin I.

LREP Oliff & Berridge, PLC

CLMN Number of Claims: 18
ECL Exemplary Claim: 1
DRWN 6 Drawing Figure(s); 4 Drawing Page(s)
LN.CNT 1511

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

SUMM entire pattern formed on the substrate and which permits the
formation of an insulating film free of water, having a low

dielectric constant and favorable for a high speed
interconnection, i.e., an insulating film excellent in film
characteristic properties, in particular, an interlayer. . . .

SUMM forming an insulating film used in the production of
semiconductor devices, wherein a methylsiloxane oligomer represented by
the chemical formula: $(CH_{sub.3})_{sub.y} SiO_{sub.2-(y/2)}$ (in the formula, y is not less than 0.8 and not more than
1.3) and having a weight-average molecular weight. . . .

DETD the present invention, there is provided a coating solution
characterized by dissolving a methylsiloxane oligomer represented by
the

chemical formula: $(CH_{sub.3})_{sub.y} SiO_{sub.2(y/2)}$ (in the formula, y is not less than 0.8 and not more than
1.3) and having a weight-average molecular weight. . . .

DETD steps formed on the substrate surface and the formation of an
insulating film which is free of water, has a low
dielectric constant, is excellent in the insulating
properties and is suitably used for producing a high speed
interconnection, for the reasons discussed. . . .

DETD the concentration is equal to the range of the value y when
methylsiloxane oligomer is expressed by the chemical formula: (

$CH_{sub.3})_{sub.y} SiO_{sub.2(y/2)}$. In other
words, the value y in the chemical formula should be limited to not
less
than 0.8 and not. . . .

DETD whole starting material, the value y of the resulting
methylsiloxane oligomer, when the latter is represented by the chemical
formula: $(CH_{sub.3})_{sub.y} SiO_{sub.2(y/2)}$,
is less than 0.8 and therefore, the resulting coating solution cannot
show the desired characteristic properties for the reasons discussed.

DETD $(CH_{sub.3})_{sub.y} SiO_{sub.2(y/2)}$
(chemical formula 1)

DETD substrate, i.e., leveling the substrate surface and they
permit

the formation of an insulating film free of moisture, having a
low dielectric constant and effective for
use in high speed interconnections, in particular, an interlayer
insulating film for semiconductor devices.

L6 ANSWER 7 OF 22 USPATFULL

AN 1999:137375 USPATFULL

TI Vacuum dispensable silicone compositions

IN Dent, Stanton James, Midland, MI, United States
Benson, Edward Joseph, Fremont, CA, United States
Norris, Ann Walstrom, Midland, MI, United States
Lee, Yeong Joo, Midland, MI, United States

PA Dow Corning Corporation, Midland, MI, United States (U.S. corporation)

PI US 5977226 19991102

AI US 1998-72229 19980504 (9)

DT Utility

EXNAM Primary Examiner: Marquis, Melvyn I.; Assistant Examiner: Milstead,
Mark

W.

LREP Milco, Larry A.

CLMN Number of Claims: 33

ECL Exemplary Claim: 1

DRWN No Drawings

LN.CNT 896

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

SUMM . . . radiological purity for RAM applications; low levels of ionic impurities (e.g., sodium, potassium, chloride); excellent electrical properties, such as a **low dielectric constant and dissipation factor**; and a low modulus, which reduces thermal stresses in the package. The compositions of the present

invention. . .

SUMM A preferred organopolysiloxane resin contains $(CH_3)_2CHSiO_{1/2}$ siloxane units, $(CH_3)_3SiO_{3/2}$ siloxane units, and $SiO_{2/2}$ siloxane units, wherein the mole ratio of the combination of $(CH_3)_3SiO_{3/2}$ and $(CH_3)_2CHSiO_{1/2}$ units and $(CH_3)_3SiO_{3/2}$ $SiO_{2/2}$ units to $SiO_{2/2}$ units is about 0.7, and the resin contains 1.75 to 2.3 percent by weight of vinyl groups.

DETD . . . of 434 and a viscosity of 2 Pa.millicentipoise; 44.4 parts of a resin consisting essentially of $(CH_3)_2CHSiO_{1/2}$ units, $(CH_3)_3SiO_{3/2}$ $SiO_{2/2}$ units, and $SiO_{2/2}$ units, wherein the mole ratio of total triorganosiloxane units to $SiO_{2/2}$ units is about 0.7:1 and the. . .

CLM What is claimed is:

. . . 1 to 100 Pa.millicentipoise at 25.degree. C.; (B) is an organopolysiloxane

resin consisting essentially of $(CH_3)_2CHSiO_{1/2}$ siloxane units, $(CH_3)_3SiO_{3/2}$

$SiO_{1/2}$ siloxane units, and $SiO_{2/2}$ siloxane units;

(C) is a trimethylsiloxy-terminated dimethylmethylhydrogensiloxane having an average degree of polymerization of 10; (E). . .

. . . 1 to 100 Pa.millicentipoise at 25.degree. C.; (B) is an organopolysiloxane

resin consisting essentially of $(CH_3)_2CHSiO_{1/2}$ siloxane units, $(CH_3)_3SiO_{3/2}$

$SiO_{1/2}$ siloxane units, and $SiO_{2/2}$ siloxane units;

(C) is a trimethylsiloxy-terminated dimethylmethylhydrogensiloxane having an average degree of polymerization of 10; (D). . .

. . . 1 to 100 Pa.millicentipoise at 25.degree. C.; (B) is an organopolysiloxane

resin consisting essentially of $(CH_3)_2CHSiO_{1/2}$ siloxane units, $(CH_3)_3SiO_{3/2}$

$SiO_{1/2}$ siloxane units, and $SiO_{2/2}$ siloxane units;

(C) is a trimethylsiloxy-terminated dimethylmethylhydrogensiloxane having an average degree of polymerization of 10; (D). . .

L6 ANSWER 8 OF 22 USPATFULL

AN 1999:61046 USPATFULL

TI Method for producing low dielectric coatings from hydrogen silsequioxane resin

IN Bremmer, Jeffrey Nicholas, Midland, MI, United States

Liu, Youfan, Midland, MI, United States

PA Dow Corning Corporation, Midland, MI, United States (U.S. corporation)

PI US 5906859 19990525

AI US 1998-113347 19980710 (9)

DT Utility

EXNAM Primary Examiner: Bell, Janyce

LREP Severance, Sharon K.

CLMN Number of Claims: 10

ECL Exemplary Claim: 1

DRWN No Drawings

LN.CNT 424

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB . . . 450.degree. C. until the normalized SiH bond density is 50 to

80%. This two step curing process produces films having **lower dielectric constant** and improved mechanical properties.

SUMM . . . 450.degree. C. until the normalized SiH bond density is 50 to 80%. This two step curing process produces films having **lower dielectric constant** and improved mechanical properties.

SUMM Coatings having a dielectric constant of 2.9-3.0 are suitable for 0.25 micron and larger electronic devices. However, coatings having **lower dielectric constants** (Dk) are required for smaller device structures (i.e. 0.13-0.18 micron). Several methods have been proposed for curing the hydrogen silsesquioxane resin to produce a **lower dielectric constant** in the coating. However, these methods often require difficult and expensive processing to produce the low Dk coatings. For example, . . .

SUMM . . . atoms which have either 0 or 2 hydrogen atoms attached thereto and/or a small number of SiC groups such as CH.sub.3 SiO.sub.3/2 or HCH.sub.3 SiO.sub.2/2 groups.

SUMM . . . in the coatings. The two step heating of the instant invention results in both the improved mechanical properties and the **low dielectric constant**. The insoluble coatings produced herein have a Dk of 2.9 or less, preferably 2.7 to 2.9.

L6 ANSWER 9 OF 22 USPATFULL

AN 1999:27155 USPATFULL

TI Process for making inorganic oxide gels in fluorocarbon solvents

IN Michalczyk, Michael Joseph, Wilmington, DE, United States

Sharp, Kenneth George, Landenburg, PA, United States

PA E. I. du Pont de Nemours and Company, Wilmington, DE, United States (U.S. corporation)

PI US 5876686 19990302

AI US 1996-663833 19960614 (8)

PRAI US 1995-576 19950628 (60)

DT Utility

EXNAM Primary Examiner: Bos, Steven

CLMN Number of Claims: 15

ECL Exemplary Claim: 1

DRWN No Drawings

LN.CNT 1519

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

SUMM . . . Si, Sn, Ti or Zr atoms. Clear network wet gels made by the process of the present invention can display **low dielectric constants** and **low refractive indexes**. The process of the present invention can be used to prepare

low energy surface coatings and primers for. . .

CLM What is claimed is:

. . . Si(OCH.sub.2 C.sub.3 F.sub.7).sub.3).sub.4 ; Si(CH.sub.2 CH.sub.2 Si(OCH.sub.2 C.sub.3 F.sub.7).sub.3).sub.4 ; Si(CH.sub.2 CH.sub.2 Si(OCH.sub.2 C.sub.3 F.sub.7).sub.3).sub.4 ; (CH.sub.3 (CF.sub.3 CH.sub.2 O).sub.3 SiCH.sub.2 CH.sub.2 SiO).sub.4 ; (CH.sub.3 ((C.sub.3 F.sub.7 CH.sub.2 O).sub.3 SiCH.sub.2 CH.sub.2 SiO).sub.4 ; (C.sub.3 F.sub.7 CH.sub.2 O).sub.3 Si(CH.sub.2).sub.2 (CF.sub.2).sub.6 (CH.sub.2).sub.2 Si(OCH.sub.2 C.sub.3 F.sub.7).sub.3 ; (CF.sub.2).sub.6 [(CH.sub.2).sub.2 . . .

L6 ANSWER 10 OF 22 USPATFULL

AN 1998:147534 USPATFULL

TI Coating solution and method for preparing the coating solution, method for forming insulating films for semiconductor devices, and method for evaluating the coating solution

IN Nakano, Tadashi, Chiba, Japan

Shimura, Makoto, Chiab, Japan

Ohta, Tomohiro, Chiba, Japan

PA Kawasaki Steel Corporation, Hyogo, Japan (non-U.S. corporation)

PI US 5840821 19981124
WO 9524639 19950914
AI US 1995-545736 19951121 (8)
WO 1994-JP1910 19941111
19951121 PCT 371 date
19951121 PCT 102(e) date
PRAI JP 1994-41314 19940311

DT Utility
EXNAM Primary Examiner: Marquis, Melvyn I.
LREP Oliff & Berridge, P.L.C.
CLMN Number of Claims: 32
ECL Exemplary Claim: 1
DRWN 6 Drawing Figure(s); 4 Drawing Page(s)
LN.CNT 1592

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

SUMM entire pattern formed on the substrate and which permits the formation of an insulating film free of water, having a low dielectric constant and favorable for a high speed interconnection, i.e., an insulating film excellent in film characteristic properties, in particular, an interlayer. . . .

SUMM forming an insulating film used in the production of semiconductor devices, wherein a methylsiloxane oligomer represented by the chemical formula: $(CH_{sub.3})_{sub.y} SiO_{sub.2-(y/2)}$ (in the formula, y is not less than 0.8 and not more than 1.3) and having a weight-average molecular weight. . . .

DETD the present invention, there is provided a coating solution characterized by dissolving a methylsiloxane oligomer represented by the

chemical formula: $(CH_{sub.3})_{sub.y} SiO_{sub.2-(y/2)}$ (in the formula, y is not less than 0.8 and not more than 1.3) and having a weight-average molecular weight. . . .

DETD steps formed on the substrate surface and the formation of an insulating film which is free of water, has a low dielectric constant, is excellent in the insulating properties and is suitably used for producing a high speed interconnection, for the reasons discussed. . . .

DETD the concentration is equal to the range of the value y when methylsiloxane oligomer is expressed by the chemical formula: $(CH_{sub.3})_{sub.y} SiO_{sub.2-(y/2)}$. In other

words, the value y in the chemical formula should be limited to not less than 0.8 and not. . . .

DETD whole starting material, the value y of the resulting methylsiloxane oligomer, when the latter is represented by the chemical formula: $(CH_{sub.3})_{sub.y} SiO_{sub.2-(y/2)}$, is less than 0.8 and therefore, the resulting coating solution cannot show the desired characteristic properties for the reasons discussed.

DETD $(CH_{sub.3})_{sub.y} SiO_{sub.2-(y/2)}$
(chemical formula 1)

DETD substrate, i.e., leveling the substrate surface and they permit

the formation of an insulating film free of moisture, having a low dielectric constant and effective for use in high speed interconnections, in particular, an interlayer insulating film for semiconductor devices.

L6 ANSWER 11 OF 22 USPATFULL

AN 1998:122017 USPATFULL

TI Display and method for producing it

IN Tanaka, Akira, Kawasaki, Japan

Hattori, Tetsuo, Yokohama, Japan

Toki, Motoyuki, Kyoto, Japan

PA Nikon Corporation, Tokyo, Japan (non-U.S. corporation)

PI US 5817255 19981006
AI US 1996-705525 19960829 (8)
PRAI JP 1995-222225 19950830
JP 1996-179695 19960709
DT Utility
EXNAM Primary Examiner: Kelly, C. H.
LREP Shapiro and Shapiro

CLMN Number of Claims: 38
ECL Exemplary Claim: 1
DRWN 5 Drawing Figure(s); 3 Drawing Page(s)
LN.CNT 837

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

SUMM . . . constant of which has been adjusted by mixing the
aforementioned dielectric gel or dielectric material with a material
having a **low dielectric constant** such as
silica produced by a sol-gel method; or iii) a material the dielectric
constant of which has been adjusted. . . .

DETD (Preparation of silica sol 2 (CH.sub.3 SiO
.sub.1.5 sol))

DETD . . . silicon (Si(OEt).sub.3 Me). Water is added dropwise to this
solution to obtain a hydroxide. In this manner, silica sol 2 (CH
.sub.3 SiO.sub.1.5 sol) is prepared.

DETD As stated above, when both of the high dielectric constant material,
such as barium titanate sol, and the **low dielectric
constant** matrix material, such as silica sol, are prepared by
the sol-gel method using alkoxide or the like as a sol. . . .

DETD (Preparation of silica sol 2 (CH.sub.3 SiO
.sub.1.5 sol))

DETD . . . monomethyl tetraethoxide (Si(OC.sub.2 H.sub.5).sub.3 CH.sub.3)
as a solvent, and 54 g of water was added dropwise to this solution,
obtaining CH.sub.3 SiO.sub.1.5 sol. The
solid content of this sol was 14.2 wt %, and after gelation and
solidification of this sol, the. . . .

DETD . . . was mixed with 13 g of barium titanate sol prepared in Example
2, preparing a sol mixture. The ratio of CH.sub.3
SiO.sub.1.5 to BaTiO.sub.3 as the solid content was 0.740:0.260,
the solid content was 5.5 wt %, and after gelation and solidification.

DETD . . . g of barium titanate sol prepared in Example 2 were mixed
together, preparing a sol mixture 3. The ratio of SiO.sub.2.
CH.sub.3 SiO.sub.1.5 :BaTiO.sub.3 as the
solid content was 0.376:0.376:0.247, the solid content was 5.5%, and
after gelation and solidification, the refractive index. . . .

L6 ANSWER 12 OF 22 USPATFULL

AN 1998:30512 USPATFULL

TI Opaque ceramic coatings

IN Camilletti, Robert Charles, Midland, MI, United States

Haluska, Loren Andrew, Midland, MI, United States

Michael, Keith Winton, Midland, MI, United States

PA Dow Corning Corporation, Midland, MI, United States (U.S. corporation)

PI US 5730792 19980324

AI US 1996-725791 19961004 (8)

DT Utility

EXNAM Primary Examiner: Brunzman, David

LREP Severance, Sharon K.

CLMN Number of Claims: 23

ECL Exemplary Claim: 1,16

DRWN No Drawings

LN.CNT 668

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

DETD . . . from that described in the '997 patent (Clark), is that in our
invention, at 400.degree. C. the methyl groups on CH.sub.

3 SiO.sub.3/2 are oxidized to form SiO.sub.2. The
oxidation may not be complete, however, due to the thickness of the

coating composition, . . .
DETD . . . be used as an interlayer dielectric, a material such as alumina
is desirable, so that the coating will have a low
dielectric constant (DK). If a coating having a high
DK is desired, a material such as barium titanate or lead niobate
should. . .

L6 ANSWER 13 OF 22 USPATFULL
AN 1998:25301 USPATFULL
TI Fluoropolymer nanocomposites
IN Michalczyk, Michael Joseph, Wilmington, DE, United States
Sharp, Kenneth George, Landenburg, PA, United States
Stewart, Charles Winfield, Newark, DE, United States
PA E. I. du Pont de Nemours and Company, Wilmington, DE, United States
(U.S. corporation)
PI US 5726247 19980310
AI US 1996-663821 19960614 (8)
PRAI US 1995-571 19950628 (60)
US 1995-2054 19950809 (60)
DT Utility
EXNAM Primary Examiner: Dean, Ralph H.
CLMN Number of Claims: 40
ECL Exemplary Claim: 1
DRWN 5 Drawing Figure(s); 4 Drawing Page(s)
LN.CNT 2854

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

DETD The standalone fluoropolymer nanocomposite coatings of the present invention are useful for coating articles requiring anti-fouling, durability, anti-reflective, **low dielectric constant**, abrasion resistant, chemical resistant, lubricity, release, anti-soiling, anti-staining or reduced surface energy characteristics. These articles can be made of glass; . . .

DETD . . . useful for coating articles requiring, for example, abrasion resistant or scratch resistant, anti-reflective, anti-fouling, chemical resistant, release, lubricity, anti-soiling, anti-staining, **low dielectric constant** or reduced surface energy characteristics. These articles can be made of glass, ceramic, amorphous

or crystalline plastic, rubber, elastomer, wood. . .

CLM What is claimed is:
. . C.sub.3 F.sub.7).sub.3).sub.4 ; Si(CH.sub.2 CH.sub.2 Si(OCH.sub.2 CF.sub.3).sub.4 ; Si(CH.sub.2 CH.sub.2 Si(OCH.sub.2 C.sub.3 F.sub.7).sub.3).sub.4 ; (CH.sub.3 ((CCF.sub.3 CH.sub.2 O).sub.3 SiCH.sub.2 CH.sub.2 SiO).sub.4 ; (CH.sub.3 ((C.sub.3 F.sub.7 CH.sub.2 O).sub.3 SiCH.sub.2 CH.sub.2)SiO).sub.4 ; (C.sub.3 F.sub.7 CH.sub.2 O).sub.3 Si(CH.sub.2).sub.2 (CF.sub.2).sub.6 (CH.sub.2).sub.2 Si(OCH.sub.2 C.sub.3 F.sub.7).sub.3 ; (CF.sub.2).sub.6 ((CH.sub.2).sub.2).sub.2 . . .

L6 ANSWER 14 OF 22 USPATFULL
AN 97:91264 USPATFULL
TI Deposited multi-layer device
IN Yamada, Katsuyuki, Mishima, Japan
PA Ricoh Company, Ltd., Tokyo, Japan (non-U.S. corporation)
PI US 5674599 19971007
AI US 1996-584289 19960111 (8)
RLI Continuation of Ser. No. US 1993-57900, filed on 7 May 1993, now abandoned
PRAI JP 1992-148124 19920514
DT Utility
EXNAM Primary Examiner: Turner, Archene
LREP Oblon, Spivak, McClelland, Maier & Neustadt, P.C.
CLMN Number of Claims: 10
ECL Exemplary Claim: 1

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

SUMM . . . extremely fine processing technique is not required, therefore advantageous to an enlargement of an area of the device, and the low dielectric constant allows to realize a high-steepness, and to obtain a ratio of Ion/Ioff, so that the MIM device can be. . .

| | | | | | |
|------|--------------|--------------------|------|------|------|
| DETD | | | | -80 | |
| 13 | PCVD | DLC | 1400 | -500 | -70 |
| 14 | PCVD | DLC | 850 | -600 | -50 |
| 15 | PCVD | DLC | 2800 | -800 | -220 |
| 16 | Sol. Gel + P | | | | |
| | | SiO.sub.2.CH.sub.3 | | | |
| | | | 8000 | +100 | +80 |

L6 ANSWER 15 OF 22 USPATFULL

AN 96:80332 USPATFULL

TI Processable silicone composite materials having high temperature resistance

IN Beckley, Don A., Newport Beach, CA, United States

Stites, John, Huntington Beach, CA, United States

PA Hitco Technologies Inc., Gardena, CA, United States (U.S. corporation)

PI US 5552466 19960903

AI US 1994-356559 19941215 (8)

RLI Continuation-in-part of Ser. No. US 1993-169505, filed on 17 Dec 1993, now abandoned

DT Utility

EXNAM Primary Examiner: Marquis, Melvyn I.

LREP Renner, Kenner, Greive, Bobak, Taylor & Weber

CLMN Number of Claims: 50

ECL Exemplary Claim: 1

DRWN No Drawings

LN.CNT 1157

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

DETD HO(CH.sub.3).sub.2 SiO--[--Si(CH.sub.3).sub.2 O--]--.sub.n Si(CH.sub.3).sub.2 OH

DETD (CH.sub.3).sub.3 SiO--[--Si(CH.sub.3).sub.2 --O--]--.sub.n Si(CH.sub.3).sub.3

DETD . . . antenna assembly of radar sets from the high temperatures experienced in flight. Radomes need to have high temperature capability,

have low dielectric constants which are stable throughout the operational temperature range, and be insulators. For vehicles travelling at high speeds, radome temperatures can. . .

DETD As briefly discussed above, the processability, high temperature properties, and low dielectric constant make the invention materials favorable for several applications requiring such electrical properties. For example, the mechanical, physical, thermal and electrical. . .

L6 ANSWER 16 OF 22 USPATFULL

AN 95:73707 USPATFULL

TI Rhodium containing catalysts for the synthesis of epoxysiloxane/epoxysilicone monomers and polymers

IN Crivello, James V., Clifton Park, NY, United States

Fan, Mingxin, Troy, NY, United States

PA General Electric Company, Waterford, NY, United States (U.S. corporation)

PI US 5442026 19950815

AI US 1994-337593 19941110 (8)

RLI Division of Ser. No. US 1992-896950, filed on 11 Jun 1992, now patented,

Pat. No. US 5387698
DT Utility
EXNAM Primary Examiner: Sellers, Robert E.
CLMN Number of Claims: 2
ECL Exemplary Claim: 1
DRWN No Drawings
LN.CNT 683

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

DETD Representative examples of suitable linear SiH-containing compounds include 1,1,3,3-tetraalkyldisiloxane, dialkylhydrogensiloxy-endstopped polydialkylsiloxane, copolymer comprising at least two alkylhydrogensiloxane groups, (e.g., (CH.sub.3).sub.2 (H)SiO[(CH.sub.3).sub.3).sub.2

SiO].sub.x [(CH.sub.3).sub.3) (H) SiO].sub.y -Si(H)(CH.sub.3).sub.2, where x and y are greater than or equal to 1). Other examples of SiH-containing compounds useful.

DETD (CH.sub.3).sub.2 HSio[(CF.sub.3 CH.sub.2 CH.sub.2) (CH.sub.3).sub.2 SiO].sub.m -[(CH.sub.3).sub.2 SiO].sub.n -Si(H) (CH.sub.3).sub.2

DETD the reaction medium and can be used particularly in cases in which the substrate is a poor solvent with a low dielectric constant. Lastly, the catalysts of the present invention are less expensive than traditional hydrosilation catalysts such as Wilkinson's catalyst. This is.

L6 ANSWER 17 OF 22 USPATFULL

AN 95:70997 USPATFULL

TI Method for producing and using crosslinked copolyesters

IN Economy, James, Urbana, IL, United States

PA The Board of Trustees of the University of Illinois, Urbana, IL, United States (U.S. corporation)

PI US 5439541 19950808

AI US 1994-193561 19940208 (8)

DT Utility

EXNAM Primary Examiner: Gallagher, John J.

LREP Dressler, Goldsmith, Shore & Milnamow, Ltd.

CLMN Number of Claims: 6

ECL Exemplary Claim: 1

DRWN 7 Drawing Figure(s); 4 Drawing Page(s)

LN.CNT 829

SUMM continuous use temperatures in air of 350.degree. C., inertness

to moisture, high strength and modulus values, outstanding dimensional stability, and low dielectric constants, crosslinked polyesters were not considered for use in adhesives, composites, rigid foams, protective coatings and as dielectrics because of various.

DRWD layer between stacked circuits with a connection between the various stacked circuits. Dielectric layers comprised of crosslinked copolyesters can have dielectric constants as

low as 3.0 and may approach 1 if the dielectric layer is in the form of a foam, which may be.

CLM What is claimed is:

end groups are selected from the group consisting of CH.sub.3

CO.sub.2 --, C.sub.2 H.sub.5 CO.sub.2 --, C.sub.6 H.sub.5 CO.sub.2 --,

(CH.sub.3).sub.3 SiO-- and CH.sub.

3 OCO.sub.2 --.

L6 ANSWER 18 OF 22 USPATFULL

AN 95:11713 USPATFULL

TI Rhodium containing selective catalysts for the synthesis of epoxysiloxane/epoxysilicone monomers and polymers

IN Crivello, James V., Clifton Park, NY, United States

Fan, Mingxin, Troy, NY, United States
 PA General Electric Company, Waterford, NY, United States (U.S. corporation)
 PI US 5387698 19950207
 AI US 1992-896950 19920611 (7)
 DCD 20091208
 DT Utility

EXNAM Primary Examiner: Ivy, C. Warren; Assistant Examiner: Trinh, Ba K.
 CLMN Number of Claims: 9
 ECL Exemplary Claim: 1
 DRWN No Drawings
 LN.CNT 725
 CAS INDEXING IS AVAILABLE FOR THIS PATENT.
 SUMM Representative examples of suitable linear SiH-containing compounds include 1,1,3,3-tetraalkyldisiloxane, dialkylhydrogensiloxyl-ended polydialkylsiloxane, copolymer comprising at least two alkylhydrogensiloxane groups, (e.g., (CH.sub.3).sub.2 (H)SiO[(CH.sub.3).sub.2 SiO].sub.x [(CH.sub.3)(H)SiO].sub.y --Si(H)(CH.sub.3).sub.2, where x and y are greater than or equal to 1). Other examples of SiH-containing compounds useful in the. . .
 SUMM (CH.sub.3).sub.2 HSio[(CF.sub.3 CH.sub.2 CH.sub.2)(CH.sub.3).sub.2 SiO].sub.m --[(CH.sub.3).sub.2 SiO].sub.n --Si(H)(CH.sub.3).sub.2
 SUMM . . . the reaction medium and can be used particularly in cases in which the substrate is a poor solvent with a low dielectric constant. Lastly, the catalysts of the present invention are less expensive than traditional hydrosilation catalysts such as Wilkinson's catalyst. This is. . .
 L6 ANSWER 19 OF 22 USPATFULL
 AN 94:59810 USPATFULL
 TI Wafer fabrication
 IN Matlow, Sheldon L., San Jose, CA, United States
 PA Nace Technology, Inc., San Jose, CA, United States (U.S. corporation)
 PI US 5328556 19940712
 AI US 1992-999209 19921231 (7)
 DT Utility
 EXNAM Primary Examiner: Powell, William A.
 LREP Fliesler, Dubb, Meyer & Lovejoy
 CLMN Number of Claims: 34
 ECL Exemplary Claim: 13
 DRWN 2 Drawing Figure(s); 2 Drawing Page(s)
 LN.CNT 7575
 DETD Fluorocarbons play a key role in the deposition of low dielectric constant dielectrics. The vaporization reagent of choice here is monohydrogen. As a demonstration of the efficacy of monohydrogen in the breaking. . .
 DETD . . . mol.sup.-1 ,
 [II-176]

$$\text{Si}(\text{cr}) + 4\text{CH.sub.3 (g) .fwdarw. (CH.sub.3).sub.4 Si(g)}$$

$$0 \quad 4 \text{ .times. } 146 \quad -245, \text{ .DELTA.H.sub.r.sup.0 (298 K.)} = -829 \text{ kJ mol.sup.-1,}$$
 [II-177]

$$\text{SiO.sub.2 (cr) + CH.sub.3 (g) .fwdarw. SiO(g) + CH.sub.3 O(g)}$$

$$-911 \quad 146 -100 \text{ 18, .DELTA.H.sub.r.sup.0 (298 K.)} = +683 \text{ kJ mol.sup.-1,}$$
 [II-178]

$$\text{SiO.sub.2 (cr) + 2CH.sub.3 (g) .fwdarw. SiO(g) + (CH.sub.3).sub.2 O(g)}$$

-911 2 .times. 146
-100 -184, .DELTA.H.sub.r.sup.0 (298 K.) = +335 kJ
mol.sup.-1,

[II-179]

SiO.sub.2 (cr) + 3CH.sub.3 (g) .fwdarw. Si(cr). . .
DET D thermodynamic data on (CH.sub.3).sub.x Si for x=1, 2, 3
~~definitive statements cannot be made with respect to the reactions of~~
methyl with silicon or silicon dioxide. It
is clear, however, that between four and eight methyls per silicon
dioxide are required to yield a volatile silicon. . .

L6 ANSWER 20 OF 22 JAPIO COPYRIGHT 2000 JPO
AN 1999-111714 JAPIO
TI MANUFACTURE OF SILICON INSULATING FILM
IN UCHIDA TADATAKA
PA JAPAN SCIENCE & TECHNOLOGY CORP, JP (CO)
PI JP 11111714 A 19990423 Heisei
AI JP1997-270732 (JP09270732 Heisei) 19971003
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 99, No.
4
AB PURPOSE: TO BE SOLVED: To form a silicon insulating film having
oxygen-resistant plasma property and hygroscopicity and having a
low dielectric constant at a low
temperature, by introducing a mixed gas or a liquid containing a
cyanate-group- and alkyl-group-having silicon material and a tertiary
amine. . . vapor of the alkyl isocyanate at atmospheric pressure or a
reduced pressure, thereby thermally decomposing them and hence depositing
a **silicon dioxide** film containing a **methyl**
group on a substrate 5 at a low deposition temperature of about
100.degree.C. A silicon insulating film having oxygen-resistant plasma.

L6 ANSWER 21 OF 22 CA COPYRIGHT 2000 ACS
AN 131:95851 CA
TI A fluorinated organic-silica film with extremely low
dielectric constant
AU Uchida, Yasutaka; Taguchi, Kohshi; Sugahara, Satoshi; Matsumura, Masakiyo
CS Teikyo University of Science and Technology, Yamanashi, 409-0193, Japan
SO Jpn. J. Appl. Phys., Part 1 (1999), 38(4B), 2368-2372
CODEN: JAPNDE; ISSN: 0021-4922
PB Japanese Journal of Applied Physics
DT Journal
LA English
TI A fluorinated organic-silica film with extremely low
dielectric constant
ST **methyl silicon fluoride oxide** dielec film
CVD

L6 ANSWER 22 OF 22 EUROPATFULL COPYRIGHT 2000 WILA

PATENT APPLICATION - PATENTANMELDUNG - DEMANDE DE BREVET

AN 960958 EUROPATFULL ED 19991212 EW 199948 FS OS
TIEN Method for producing hydrogenated silicon oxycarbide films.
TIDE Verfahren zur Herstellung von hydriertem Silizium-Oxy-Karbid.
TIFR Procédé pour la préparation de silicium-oxy-carbure hydrogene.
IN Loboda, Mark Jon, 1902 Vine Street, Midland, Michigan 48640, US;
Seifferly, Jeffrey Alan, 3007 Linden Park Drive, Bay City, Michigan
48706, US
PA DOW CORNING CORPORATION, 3901 S. Saginaw Road, Midland Michigan
48686-0994, US
PAN 275274
AG Patentanwaelte Sternagel & Fleischer, Braunsberger Feld 29, 51429
Bergisch Gladbach, DE

AGN 101441
OS ESP1999088 EP 0960958 A2 991201
SO Wila-EPZ-1999-H48-T1a
DT Patent
LA Anmeldung in Englisch; Veroeffentlichung in Englisch
DS R AT; R BE; R CH; R CY; R DE; R DK; R ES; R FI; R FR; R GB; R GR; R IE;
R IT; R LI; R LU; R MC; R NL; R PT; R SE; R AL; R LT; R LV; R MK; R RO;
R SI

PIT EPA2 EUROPÄISCHE PATENTANMELDUNG

PI EP 960958 A2 19991201

OD 19991201

AI EP 1999-110260 19990527

PRAI US 1998-86811 19980529

ABEN This invention is a method for producing hydrogenated silicon oxycarbide

(H:SiOC) films having a **low dielectric constant**. This method comprises reacting an methyl-containing silane in a controlled oxygen environment using plasma enhanced or ozone

assisted chemical vapor. . . .
DETEN. . . have high dielectric constants (i.e. 3.8 or greater). Therefore there is a need for processes and materials that result in **low dielectric constant** films. A new deposition processes known as Low-k Flowfill.reg., produces films having a dielectric constant of <3.0. This method uses a chemical vapor deposition reaction between methylsilane and hydrogen peroxide to produce a **methyl doped silicon oxide** film (See S. McClatchie, K.

Beekmann, A. Kiermasz; **Low Dielectric Constant** Oxide Films Deposited Using CVD Techniques, 1988 DUMIC Conference Proceedings, 2/98, p. 311-318). However, this process requires a non standard.

An object of this invention is to provide a method for producing **low dielectric constant** thin films of hydrogenated silicon oxycarbide by chemical vapor deposition.

This invention pertains to a method of producing thin films of hydrogenated silicon oxycarbide (H:SiOC) having **low**

dielectric constants on substrates, preferably semiconductor devices. The method comprises the plasma enhanced or

ozone ~~enhanced chemical vapor deposition of a reaction.~~ . . .

The films produced, ~~due to the low dielectric constant,~~ are particularly suited as interlayer dielectrics in semiconductor integrated circuit manufacturing such as gate

dielectrics,
premetal and intermetal dielectrics and. . .

L14 ANSWER 2 OF 10 USPATFULL
AN 1999:163594 USPATFULL
TI Method of manufacturing a semiconductor device
IN Konishi, Nobuo, Yamanashi-ken, Japan
PA Tokyo Electron Limited, Tokyo, Japan (non-U.S. corporation)
PI US 6001739 19991214
AI US 1997-979658 19971126 (8)
PRAI JP 1996-332814 19961127
DT Utility
EXNAM Primary Examiner: Powell, William
LREP Obion, Spivak, McClelland, Maier & Neustadt, P.C.
CLMN Number of Claims: 16
ECL Exemplary Claim: 1
DRWN 27 Drawing Figure(s); 6 Drawing Page(s)
LN.CNT 581
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
AB A method of manufacturing a semiconductor device comprising the steps
of
forming an organic insulating film of a **low dielectric**
constant on a surface of a silicon wafer, forming a photoresist
film on the organic insulating film, exposing the photoresist film.
DETD Using Chemical Vapor Deposition method or spin coating method, an
organic insulating film 1A of (CH.sub.3 --
SiO.sub.2).sub.n is formed on the surface of the wafer W (Step
S1), as shown in FIG. 2A. The wafer W used.
DETD The wafer W is then loaded into the dry developing chamber 14 and then
an **oxygen gas plasma** is generated. **Oxygen**
radicals generated from the **oxygen gas plasma** thus
obtained are allowed to react with a photoresist film of the wafer. In
this manner, the photoresist film 2A.
DETD FIG. 6 is a graph showing the **oxygen-plasma etching**
amount of the photoresist film having a cured surface layer 2H
according
to the present invention by comparison with.
DETD . . . figure, the photoresist film of the comparable embodiment is
removed in a thickness of 100 to 102 nm during 60-second **oxygen**
-plasma etching, whereas the photoresist film having a cured
surface layer portion 2H of the present invention is removed only in.
DETD Thereafter, the wafer W is loaded in a dry etching device having plate
electrodes arranged in parallel. The **oxygen gas plasma**
is generated between the electrodes, thereby applying a reactive ion
etching due to oxygen radicals onto the insulating film 1.

L14 ANSWER 3 OF 10 USPATFULL
AN 1998:30512 USPATFULL
TI Opaque ceramic coatings
IN Camilletti, Robert Charles, Midland, MI, United States
Haluska, Loren Andrew, Midland, MI, United States
Michael, Keith Winton, Midland, MI, United States
PA Dow-Corning Corporation, Midland, MI, United States (U.S. corporation)
PI US 5730792 19980324
AI US 1996-725791 19961004 (8)
DT Utility
EXNAM Primary Examiner: Brunsman, David
LREP Severance, Sharon K.

CLMN Number of Claims: 23
ECL Exemplary Claim: 1,16
DRWN No Drawings
LN.CNT 668

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

DETD . . . from that described in the '997 patent (Clark), is that in our invention, at 400 degree C. the methyl groups on CH-sub. 3 SiO.sub.3/2 are oxidized to form SiO.sub.2. The oxidation may not be complete, however, due to the thickness of the coating composition, . . .

DETD . . . be used as an interlayer dielectric, a material such as alumina

is desirable, so that the coating will have a low dielectric constant (DK). If a coating having a high DK is desired, a material such as barium titanate or lead niobate should. . .

CLM What is claimed is:

. wherein the coated surface of the electronic device is pyrolyzed in an environment selected from the group consisting of air, oxygen, oxygen plasma, an inert gas, ammonia, an amine, moisture, and nitrous oxide.

L14 ANSWER 4 OF 10 USPATFULL

AN 1998:25301 USPATFULL

TI Fluoropolymer nanocomposites

IN Michalczyk, Michael Joseph, Wilmington, DE, United States

Sharp, Kenneth George, Landenburg, PA, United States

Stewart, Charles Winfield, Newark, DE, United States

PA E. I. du Pont de Nemours and Company, Wilmington, DE, United States
(U.S. corporation)

PI US 5726247 19980310

AI US 1996-663821 19960614 (8)

PRAI US 1995-571 19950628 (60)

US 1995-2054 19950809 (60)

DT Utility

EXNAM Primary Examiner: Dean, Ralph H.

CLMN Number of Claims: 40

ECL Exemplary Claim: 1

DRWN 5 Drawing Figure(s); 4 Drawing Page(s)

LN.CNT 2854

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

DETD The standalone fluoropolymer nanocomposite coatings of the present invention are useful for coating articles requiring anti-fouling, durability, anti-reflective, low dielectric

constant, abrasion resistant, chemical resistant, lubricity, release, anti-soiling, anti-staining or reduced surface energy characteristics. These articles can be made of glass; . . .

DETD . . . useful for coating articles requiring, for example, abrasion resistant or scratch resistant, anti-reflective, anti-fouling, chemical resistant, release, lubricity, anti-soiling, anti-staining, low dielectric constant or reduced surface energy

characteristics. These articles can be made of glass, ceramic, amorphous

or crystalline plastic, rubber, elastomer, wood. . .

DETD . . . 199-229). Vinylpolyfluoroalkanes; trans-divinylperfluoro-1,3-dioxolanes; all of the "TEFLON" AF, "TEFLON" FEP, and "KALREZ" fluoropolymers; zirconia, crystalline Nylon 6,6; "NOMEX" aramid paper, oxygen plasma-treated "MYLAR" polyester film; "KAPTON"

polyimide film; silicone rubber; "NORDEL" rubber, "VAMAC" elastomer, or "VITON" elastomer, polymethylmethacrylate; copper and brass were. . .

DETD A piece of oxygen plasma-treated "MYLAR" polyester film (22.5 mm.times.77 mm.times.0.023 mm) was dipcoated using the solution described in Example 31. The sample was air. . .

DETD A piece of oxygen plasma-treated "MYLAR" polyester

film (22.5 mm.times.77 mm.times.0.023 mm) was dipcoated using the solution described in Example 32. The sample was air. . .

CLM What is claimed is:
C.sub.3 F.sub.7).sub.3).sub.4 ; Si(CH.sub.2 CH.sub.2 Si(OCH.sub.2 CF.sub.3).sub.3).sub.4 ; Si(CH.sub.2 CH.sub.2 Si(OCH.sub.2 C.sub.3 F.sub.7).sub.3).sub.4 ; (CH.sub.3 ((CCF.sub.3 CH.sub.2 O).sub.3 SiCH.sub.2 CH.sub.2 SiO).sub.4 ; ((C.sub.3 F.sub.7 CH.sub.2 O).sub.3 SiCH.sub.2 CH.sub.2)SiO).sub.4 ; (C.sub.3 F.sub.7 CH.sub.2 O).sub.3 Si(CH.sub.2).sub.2 (CF.sub.2).sub.6 (CH.sub.2).sub.2 Si(OCH.sub.2 C.sub.3 F.sub.7).sub.3 ; (CF.sub.2).sub.6 ((CH.sub.2).sub.2. . .

L14 ANSWER 5 OF 10 USPATFULL

AN 97:9818 USPATFULL

TI Adhesive layer in multi-level packaging and organic material as a metal diffusion barrier

IN Adamopoulos, Eleftherios, Bronx, NY, United States

Kim, Jungihl, Seoul, Korea, Republic of

Lee, Kang-Wook, Yorktown Heights, NY, United States

Oh, Tae S., Seoul, Korea, Republic of

O'Toole, Terrence R., Hopewell Junction, NY, United States

Purushothaman, Sampath, Yorktown Heights, NY, United States

Ritsko, John J., Mount Kisco, NY, United States

Shaw, Jane M., Ridgefield, CT, United States

Viehbeck, Alfred, Stormville, NY, United States

Walker, George F., New York, NY, United States

PA International Business Machines Corporation, Armonk, NY, United States (U.S. corporation)

PI US-5599582 19970204

AI US-1995-475412 19950607 (8)

RLI Division of Ser. No. US 1994-197941, filed on 17 Feb 1994 which is a division of Ser. No. US 1991-771929, filed on 7 Oct 1991, now patented, Pat. No. US 5326643

DT Utility

EXNAM Primary Examiner: Beck, Shrive; Assistant Examiner: Cameron, Erma

LREP Scully, Scott, Murphy & Presser

CLMN Number of Claims: 10

ECL Exemplary Claim: 1

DRWN -6 Drawing Figure(s); 5 Drawing Page(s)

LN.CNT 1009

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

SUMM . . . dielectric layers in electronic packaging, especially multilevel packaging. Polyimides are especially suitable in these applications since they have good processability, low dielectric constant, high thermal stability, low moisture absorption, good mechanical properties and the like.

DETD The preferred silane coupling agents contain an Si--O-alkyl group such as SiOC.sub.2 H.sub.5 by which it is intended that such silane coupling agents contain up to about three Si--O-alkyl groups.

DETD . . . PMDA-ODA to THERMID adhesion was 68 g/mm. In another experiment

the THERMID 6015, after curing, was down-streamed ashed with Plasmatech plasma equipment using oxygen and nitroso oxide gases followed by spin coating a non-acid precursor of PMDA-ODA polyimide at

a thickness of 20 .mu.m. . .

DETD In other embodiments, the glass ceramic substrate previously described was similarly ashed by means of an oxygen plasma and a silane coupling agent applied which was baked at 85.degree. C. for thirty minutes after which a thin layer. . .

L14 ANSWER 6 OF 10 USPATFULL

AN 96:113664 USPATFULL

TI Adhesive layer in multi-level packaging and organic material as a metal diffusion barrier

IN Adamopoulos, Eleftherios, Bronx, NY, United States
Kim, Jungihl, Seoul, Korea, Republic of
Lee, Kang-Wook, Yorktown Heights, NY, United States
Oh, Tae S., Seoul, Korea, Republic of
O'Toole, Terrence R., Hopewell Junction, NY, United States
Purushothaman, Sampath, Yorktown Heights, NY, United States
Ritsko, John J., Mount Kisco, NY, United States

Shaw, Jane M., Ridgefield, CT, United States
Viehbeck, Alfred, Stormville, NY, United States
Walker, George F., New York, NY, United States

PA International Business Machines Corporation, Armonk, NY, United States
(U.S. corporation)

PI US 5582858 19961210

AI US 1995-474985 19950607 (8)

RLI Division of Ser. No. US 1994-197941, filed on 17 Feb 1994 76 Ser. No.

US 1991-771929, filed on 7 Oct 1991, now patented, Pat. No. US 5326643

DT Utility

EXNAM Primary Examiner: Beck, Shrive; Assistant Examiner: Cameron, Erma

LREP Scully, Scott, Murphy & Presser

CLMN Number of Claims: 14

ECL Exemplary Claim: 1

DRWN 6 Drawing Figure(s); 5 Drawing Page(s)

LN.CNT 1042

SUMM . . . dielectric layers in electronic packaging, especially
multilevel packaging. Polyimides are especially suitable in these
applications since they have good processability, low
dielectric constant, high thermal stability, low
moisture absorption, good mechanical properties and the like.

DETD The preferred silane coupling agents contain an Si--O-alkyl group such
as SiOC.sub.2 H.sub.5 by which it is intended that such silane
coupling agents contain up to about three Si---O-alkyl groups.

DETD . . . PMDA-ODA to THERMID adhesion was 68 g/mm. In another
experiment
the THERMID 6015, after curing, was down-streamed ashed with Plasmatech
plasma equipment using oxygen and nitroso oxide gases
followed by spin coating a non-acid precursor of PMDA-ODA polyimide at
a
thickness of 20 .mu.m.

DETD In other embodiments, the glass ceramic substrate previously described
was similarly ashed by means of an oxygen plasma and
a silane coupling agent applied which was baked at 85.degree. C. for
thirty minutes after which a thin layer. . .

CLM What is claimed is:
3. The process of claim 2 where said silane coupling agent contains
a
Si--O-alkyl group and said plasma comprises a plasma based on
oxygen, nitroso oxide or argon.

L14 ANSWER 7 OF 10 USPATFULL

AN 96:99290 USPATFULL

TI Adhesive layer in multi-level packaging and organic material as a metal
diffusion barrier

IN Adamopoulos, Eleftherios, Bronx, NY, United States
Lee, Kang-Wook, Yorktown Heights, NY, United States
O'Toole, Terrence R., Hopewell Junction, NY, United States
Purushothaman, Sampath, Yorktown Heights, NY, United States
Shaw, Jane M., Ridgefield, CT, United States
Viehbeck, Alfred, Stormville, NY, United States
Walker, George F., New York, NY, United States

PA International Business Machines Corporation, Armonk, NY, United States
(U.S. corporation)

PI US 5569739 19961029

AI US 1994-197941 19940217 (8)

RLI Division of Ser. No. US 1991-771929, filed on 7 Oct 1991, now patented,
Pat. No. US 5326643
DT Utility
EXNAM Primary Examiner: Nutter, Nathan M.; Assistant Examiner: Jones, Richard
LREP Scully, Scott, Murphy & Presser
CLMN Number of Claims: 16
ECL Exemplary Claim: 1
DRWN 6 Drawing Figure(s); 5 Drawing Page(s)
LN.CNT 1040
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
SUMM . . . dielectric layers in electronic packaging, especially
multilevel packaging. Polyimides are especially suitable in these
applications since they have good processability, low
dielectric constant, high thermal stability, low
moisture absorption, good mechanical properties and the like.
DETD The preferred silane coupling agents contain an Si-O-alkyl group such
as
SiOC.sub.2 H.sub.5 by which it is intended that such silane
coupling agents contain up to about three Si-O-alkyl groups.
DETD . . . PMDA-ODA to THERMID adhesion was 68 g/mm. In another
experiment
the THERMID 6015, after curing, was down-streamed ashed with Plasmatech
plasma equipment using **oxygen** and nitroso oxide gases
followed by spin coating a non-acid precursor of PMDA-ODA polyimide at
a
thickness of 20 .mu.m.
DETD In other embodiments, the glass ceramic substrate previously described
was similarly ashed by means of an **oxygen plasma** and
a silane coupling agent applied which was baked at 85.degree. C. for
thirty minutes after which a thin layer. . .

L14 ANSWER 8 OF 10 USPATFULL

AN 94:57688 USPATFULL

TI Adhesive layer in multi-level packaging and organic material as a metal
diffusion barrier

IN Adamopoulos, Eleftherios, Bronx, NY, United States

Kim, Jungihl, Seoul, Korea, Republic of

Lee, Kang-Wook, Yorktown Heights, NY, United States

Oh, Tae S., Cheongryang, Korea, Republic of

O'Toole, Terrence R., Hopewell Junction, NY, United States

Purushothaman, Sampath, Yorktown Heights, NY, United States

Ritsko, John J., Mount Kisco, NY, United States

Shaw, Jane M., Ridgefield, CT, United States

Viehbeck, Alfred, Stormville, NY, United States

Walker, George F., New York, NY, United States

PA International Business Machines Corporation, Armonk, NY, United States
(U.S. corporation)

PI US 5326643 19940705

AI US 1991-771929 19911007 (7)

DT Utility

EXNAM Primary Examiner: Ryan, Patrick J.; Assistant Examiner: Lee, Kam F.

LREP Scully, Scott, Murphy & Presser

CLMN Number of Claims: 31

ECL Exemplary Claim: 1

DRWN 5 Drawing Figure(s); 5 Drawing Page(s)

LN.CNT 1061

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

SUMM . . . dielectric layers in electronic packaging, especially
multilevel packaging. Polyimides are especially suitable in these
applications since they have good processability, low

dielectric constant, high thermal stability, low

moisture absorption, good mechanical properties and the like.

DETD The preferred silane coupling agents contain an Si--O--alkyl group such
as SiOC.sub.2 H.sub.5 by which it is intended that such silane
coupling agents contain up to about three Si--O--alkyl groups.

DETD PMDA-ODA to THERMID adhesion was 68 g/mm. In another experiment

the THERMID 6015, after curing, was down-streamed ashed with Plasmatech plasma equipment using oxygen and nitroso oxide gases followed by spin coating a non-acid precursor of PMDA-ODA polyimide at

a

thickness of 20 .mu.m.

DETD In other embodiments, the glass ceramic substrate previously described was similarly ashed by means of an oxygen plasma and a silane coupling agent applied which was baked at 85.degree. C. for thirty minutes after which a thin layer.

L14 ANSWER 9 OF 10 JAPIO COPYRIGHT 2000 JPO

AN 1999-111714 JAPIO

TI MANUFACTURE OF SILICON INSULATING FILM

IN UCHIDA TADATAKA

PA JAPAN SCIENCE & TECHNOLOGY CORP, JP (CO)

PI JP 1111714 A 19990423 Heisei

AI JP1997-270732 (JP09270732 Heisei) 19971003

SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 99, No. 4

AB PURPOSE: TO BE SOLVED: To form a silicon insulating film having oxygen-resistant plasma property and hygroscopicity and having a low dielectric constant at a low temperature, by introducing a mixed gas or a liquid containing a cyanate-group and alkyl-group having silicon material and a tertiary amine. vapor of the alkyl isocyanate at atmospheric pressure or a reduced pressure, thereby thermally decomposing them and hence depositing a silicon dioxide film containing a methyl group on a substrate 5 at a low deposition temperature of about 100.degree.C. A silicon insulating film having oxygen-resistant plasma property and hygroscopicity and having a low dielectric constant can be formed.

L14 ANSWER 10 OF 10 EUROPATFULL COPYRIGHT 2000 WILA

PATENT APPLICATION - PATENTANMELDUNG - DEMANDE DE BREVET

AN 960958 EUROPATFULL ED-19991212 EW-199948 FS OS

TIEN Method for producing hydrogenated silicon oxycarbide films.

TIDE Verfahren zur Herstellung von hydriertem Silizium-Oxy-Karbid.

TIFR Procédé pour la préparation de silicium-oxy-carbure hydrogène.

IN Loboda, Mark Jon, 1902 Vine Street, Midland, Michigan 48640, US; Seifferly, Jeffrey Alan, 3007 Linden Park Drive, Bay City, Michigan 48706, US

PA DOW CORNING CORPORATION, 3901 S. Saginaw Road, Midland Michigan 48686-0994, US

PAN 275274

AG Patentanwalte Sternagel & Fleischer, Braunsberger Feld 29, 51429 Bergisch Gladbach, DE

AGN 101441

OS ESP1999088 EP 0960958 A2 991201

SO Wila-EPZ-1999-H48-T1a

DT Patent

LA Anmeldung in Englisch; Veröffentlichung in Englisch

DS R AT; R BE; R CH; R CY; R DE; R DK; R ES; R FI; R FR; R GB; R GR; R IE; R IT; R LI; R LU; R MC; R NL; R PT; R SE; R AL; R LT; R LV; R MK; R RO; R SI

PIT EPA2 EUROPAEISCHE PATENTANMELDUNG

PI EP 960958 A2 19991201

OD 19991201

AI EP 1999-110260 19990527

PRAI US 1998-86811 19980529

ABEN This invention is a method for producing hydrogenated silicon oxycarbide

(H:SiOC) films having a low dielectric constant. This method comprises reacting an methyl-containing silane in a controlled oxygen environment using plasma enhanced or ozone assisted chemical vapor deposition to produce said films. The resulting films are useful in the manufacture of. . . .

DETDEN. . . . have high dielectric constants (i.e. 3.8 or greater). Therefore there is a need for processes and materials that result in low dielectric constant films. A new deposition processes known as Low-k Flowfill.reg., produces films having a dielectric constant of <3.0. This method uses a chemical vapor deposition reaction between methylsilane and hydrogen peroxide to produce a methyl doped silicon oxide film (See S. McClatchie, K. Beekmann, A. Kiermasz; Low Dielectric Constant Oxide Films Deposited Using CVD Techniques, 1988 DUMIC Conference Proceedings, 2/98, p. 311-318). However, this process requires a non standard. . . . An object of this invention is to provide a method for producing low dielectric constant thin films of hydrogenated silicon oxycarbide by chemical vapor deposition. This invention pertains to a method of producing thin films of hydrogenated silicon oxycarbide (H:SiOC) having low dielectric constants on substrates, preferably semiconductor devices. The method comprises the plasma enhanced or ozone enhanced chemical vapor deposition of a reaction. . . . Another . . . the method of this invention is the ability to link successive growth processes to produce multilayer structures for example of SiO.sub2./H:SiOC/SiO.sub2. or SiC:H/H:SiOC/SiC:H by increasing or deleting the oxygen providing gas at the appropriate time during the CVD process. It is preferred to. . . . The films produced, due to the low dielectric constant, are particularly suited as interlayer dielectrics in semiconductor integrated circuit manufacturing such as gate dielectrics, premetal and intermetal dielectrics and. . . .

CLMEN. . . silane and the oxygen providing gas to produce a film containing successive layers selected from the group consisting of SiO.sub2./ H: SiOC and SiC:H.

L12 ANSWER 1 OF 7 USPATFULL
AN 97:9818 USPATFULL
TI Adhesive layer in multi-level packaging and organic material as a metal diffusion barrier
IN Adamopoulos, Eleftherios, Bronx, NY, United States
Kim, Jungihl, Seoul, Korea, Republic of
Lee, Kang-Wook, Yorktown Heights, NY, United States
Oh, Tae S., Seoul, Korea, Republic of
O'Toole, Terrence R., Hopewell Junction, NY, United States
Purushothaman, Sampath, Yorktown Heights, NY, United States
Ritsko, John J., Mount Kisco, NY, United States
Shaw, Jane M., Ridgefield, CT, United States
Viehbeck, Alfred, Stormville, NY, United States
Walker, George F., New York, NY, United States
PA International Business Machines Corporation, Armonk, NY, United States (U.S. corporation)
PI US 5599582 19970204
AI US 1995-475412 19950607 (8)
RLI Division of Ser. No. US 1994-197941, filed on 17 Feb 1994 which is a division of Ser. No. US 1991-771929, filed on 7 Oct 1991, now patented, Pat. No. US 5326643
DT Utility
EXNAM Primary Examiner: Beck, Shrive; Assistant Examiner: Cameron, Erma
LREP Scully, Scott, Murphy & Presser
CLMN Number of Claims: 10
ECL Exemplary Claim: 1
DRWN 6 Drawing Figure(s); 5 Drawing Page(s)
LN.CNT 1009
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
SUMM . . . dielectric layers in electronic packaging, especially multilevel packaging. Polyimides are especially suitable in these applications since they have good processability, low dielectric constant, high thermal stability, low moisture absorption, good mechanical properties and the like.
DETD The preferred silane coupling agents contain an Si--O-alkyl group such as SiOC.sub.2 H.sub.5 by which it is intended that such silane coupling agents contain up to about three Si--O-alkyl groups.

L12 ANSWER 2 OF 7 USPATFULL
AN 96:113664 USPATFULL
TI Adhesive layer in multi-level packaging and organic material as a metal diffusion barrier
IN Adamopoulos, Eleftherios, Bronx, NY, United States
Kim, Jungihl, Seoul, Korea, Republic of
Lee, Kang-Wook, Yorktown Heights, NY, United States
Oh, Tae S., Seoul, Korea, Republic of
O'Toole, Terrence R., Hopewell Junction, NY, United States
Purushothaman, Sampath, Yorktown Heights, NY, United States
Ritsko, John J., Mount Kisco, NY, United States
Shaw, Jane M., Ridgefield, CT, United States
Viehbeck, Alfred, Stormville, NY, United States
Walker, George F., New York, NY, United States
PA International Business Machines Corporation, Armonk, NY, United States (U.S. corporation)
PI US 5582858 19961210
AI US 1995-474985 19950607 (8)
RLI Division of Ser. No. US 1994-197941, filed on 17 Feb 1994 76 Ser. No.
US

1991-771929, filed on 7 Oct 1991, now patented, Pat. No. US 5326643
DT Utility
EXNAM Primary Examiner: Beck, Shrive; Assistant Examiner: Cameron, Erma
LREP Scully, Scott, Murphy & Presser
CLMN Number of Claims: 14
ECL Exemplary Claim: 1
DRWN 6 Drawing Figure(s); 5 Drawing Page(s)

LN.CNT 1042

SUMM . . . dielectric layers in electronic packaging, especially multilevel packaging. Polyimides are especially suitable in these applications since they have good processability, low dielectric constant, high thermal stability, low moisture absorption, good mechanical properties and the like.

DETD The preferred silane coupling agents contain an Si--O-alkyl group such as SiOC.sub.2 H.sub.5 by which it is intended that such silane coupling agents contain up to about three Si---O-alkyl groups.

L12 ANSWER 3 OF 7 USPATFULL

AN 96:99290 USPATFULL

TI Adhesive layer in multi-level packaging and organic material as a metal diffusion barrier

IN Adamopoulos, Eleftherios, Bronx, NY, United States
Lee, Kang-Wook, Yorktown Heights, NY, United States
O'Toole, Terrence R., Hopewell Junction, NY, United States
Purushothaman, Sampath, Yorktown Heights, NY, United States
Shaw, Jane M., Ridgefield, CT, United States
Viehbeck, Alfred, Stormville, NY, United States
Walker, George F., New York, NY, United States

PA International Business Machines Corporation, Armonk, NY, United States (U.S. corporation)

PI US 5569739 19961029

AI US 1994-197941 19940217 (8)

RLI Division of Ser. No. US 1991-771929, filed on 7 Oct 1991, now patented, Pat. No. US 5326643

DT Utility

EXNAM Primary Examiner: Nutter, Nathan M.; Assistant Examiner: Jones, Richard

LREP Scully, Scott, Murphy & Presser

CLMN Number of Claims: 16

ECL Exemplary Claim: 1

DRWN 6 Drawing Figure(s); 5 Drawing Page(s)

LN.CNT 1040

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

SUMM . . . dielectric layers in electronic packaging, especially multilevel packaging. Polyimides are especially suitable in these applications since they have good processability, low dielectric constant, high thermal stability, low moisture absorption, good mechanical properties and the like.

DETD The preferred silane coupling agents contain an Si-O-alkyl group such as

SiOC.sub.2 H.sub.5 by which it is intended that such silane coupling agents contain up to about three Si-O-alkyl groups.

L12 ANSWER 4 OF 7 USPATFULL

AN 94:57688 USPATFULL

TI Adhesive layer in multi-level packaging and organic material as a metal diffusion barrier

IN Adamopoulos, Eleftherios, Bronx, NY, United States
Kim, Jungihl, Seoul, Korea, Republic of
Lee, Kang-Wook, Yorktown Heights, NY, United States
Oh, Tae S., Cheongryang, Korea, Republic of
O'Toole, Terrence R., Hopewell Junction, NY, United States
Purushothaman, Sampath, Yorktown Heights, NY, United States
Ritsko, John J., Mount Kisco, NY, United States
Shaw, Jane M., Ridgefield, CT, United States
Viehbeck, Alfred, Stormville, NY, United States

Walker, George F., New York, NY, United States
PA International Business Machines Corporation, Armonk, NY, United States
(U.S. corporation)
PI US 5326643 19940705
AI US 1991-771929 19911007 (7)
DT Utility
EXNAM ~~Primary Examiner: Ryan, Patrick J.; Assistant Examiner: Lee, Kam-F.~~

LREP Scully, Scott, Murphy & Presser
CLMN Number of Claims: 31
ECL Exemplary Claim: 1
DRWN 5 Drawing Figure(s); 5 Drawing Page(s)
LN.CNT 1061

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

SUMM . . . dielectric layers in electronic packaging, especially
multilevel packaging. Polyimides are especially suitable in these
applications since they have good processability, low
dielectric constant, high thermal stability, low
moisture absorption, good mechanical properties and the like.

DETD The preferred silane coupling agents contain an Si--O--alkyl group such
as SiOC.sub.2 H.sub.5 by which it is intended that such silane
coupling agents contain up to about three Si--O--alkyl groups.

L12 ANSWER 5 OF 7 USPATFULL

AN 93:22898 USPATFULL

TI Process for preparing brominated telomers of chlorotrifluoroethylene
IN Caporiccio, Gerardo, Milan, Italy
Gornowicz, Gerald A., Midland, MI, United States
Boutevin, Bernard, Montpellier, France

PA Dow Corning Corporation, Midland, MI, United States (U.S. corporation)

PI US 5196614 19930323

AI US 1992-874900 19920429 (7)

RLI Continuation-in-part of Ser. No. US 1990-590850, filed on 1 Oct 1990,
now patented, Pat. No. US 5110973 which is a continuation-in-part of
Ser. No. US 1989-373393, filed on 30 Jun 1989, now abandoned

DT Utility

EXNAM Primary Examiner: Prescott, Arthur C.

LREP Gobrogge, Roger E.

CLMN Number of Claims: 7

ECL Exemplary Claim: 1

DRWN No Drawings

LN.CNT 710

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

SUMM **low dielectric constant** and high
resistivity and dielectric strength

DETD . . . from 12.85 to 16.31 ppm. using tetramethylsilane as the
reference. This was attributed to a silane of the structure
(R.sub.f).sub.3 SiOC.sub.2 H.sub.5 (B), where R.sub.f is
C.sub.2 F.sub.5 (C.sub.2 F.sub.3 Cl).sub.n C.sub.3 F.sub.6 C.sub.2
H.sub.4, where the average value for n. . .

L12 ANSWER 6 OF 7 USPATFULL

AN 92:101152 USPATFULL

TI Chemically inert fluorinated organosilicon compounds and fluorocarbon
telomers for preparing same

IN Caporiccio, Gerardo, Midland, MI, United States

PA Dow Corning Corporation, Midland, MI, United States (U.S. corporation)

PI US 5169998 19921208

AI US 1991-763771 19910923 (7)

RLI Division of Ser. No. US 1990-590850, filed on 1 Oct 1990, now patented,
Pat. No. US 5110973 which is a continuation-in-part of Ser. No. US
1989-373393, filed on 30 Jun 1989, now abandoned

DT Utility

EXNAM Primary Examiner: Shaver, Paul F.

LREP Spector, Robert

CLMN Number of Claims: 4

ECL Exemplary Claim: 1

DRWN No Drawings

LN.CNT 687

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

DETD **low dielectric constant** and high
resistivity and dielectric strength

DETD . . . from 12.85 to 16.31 ppm. using tetramethylsilane as the
reference. This was attributed to a silane of the structure
(R.sub.f).sub.3 SiOC.sub.2 H.sub.5 (B), where R.sub.f is
C.sub.2 F.sub.5 (C.sub.2 F.sub.3 Cl).sub.n C.sub.3 F.sub.6 C.sub.2
H.sub.4 --, where the value for n. . .

L12 ANSWER 7 OF 7 USPATFULL

AN 92:36358 USPATFULL

TI Chemically inert fluorinated organosilicon compounds

IN Caporiccio, Gerardo, Midland, MI, United States

PA Dow Corning Corporation, Midland, MI, United States (U.S. corporation)

PI US 5110973 19920505

AI US 1990-590850 19901001 (7)

RLI Continuation-in-part of Ser. No. US 1989-373393, filed on 30 Jun 1989,
now abandoned

DT Utility

EXNAM Primary Examiner: Prescott, Arthur C.; Assistant Examiner: Shaver, P.
F.

LREP Spector, Robert

CLMN Number of Claims: 8

ECL Exemplary Claim: 1

DRWN No Drawings

LN.CNT 703

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

DETD **low dielectric constant** and high
resistivity and dielectric strength

DETD . . . from 12.85 to 16.31 ppm. using tetramethylsilane as the
reference. This was attributed to a silane of the structure
(R.sub.f).sub.3 SiOC.sub.2 H.sub.5 (B), where R.sub.f is
C.sub.2 F.sub.5 (C.sub.2 F.sub.3 Cl).sub.n C.sub.3 F.sub.6 C.sub.2
H.sub.4 --, where the value for n. . .

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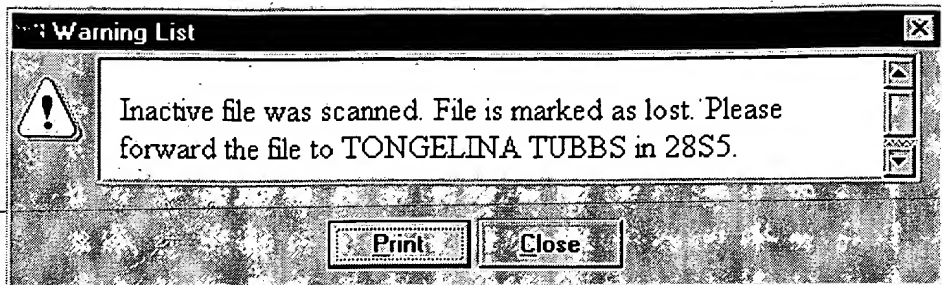
05851304 **Image available**
OPTICAL PICKUP AND OPTICAL ELEMENT USED FOR THE SAME

PUB. NO.: 10-134404 [JP 10134404 A]
PUBLISHED: May 22, 1998 (19980522).
INVENTOR(s): FUJITA MITSURU
APPLICANT(s): TOYO COMMUN EQUIP CO LTD [000310] (A Japanese Company or
 Corporation), JP (Japan)
APPL. NO.: 09-050993 [JP 9750993]
FILED: February 19, 1997 (19970219).
INTL CLASS: [6] G11B-007/135; G02B-005/04; G02B-005/30;
 G02B-027/28; G02B-027/40; G11B-007/125; G11B-019/12
JAPIO CLASS: 42.5 (ELECTRONICS -- Equipment); 29.2 (PRECISION INSTRUMENTS
 -- Optical Equipment)
JAPIO KEYWORD: R002 (LASERS); R011 (LIQUID CRYSTALS); R102 (APPLIED
 ELECTRONICS -- Video Disk Recorders, VDR)

ABSTRACT

PROBLEM TO BE SOLVED: To provide an optical pickup which contributes to the miniaturization of a reproducing device and is easy to handle and an optical element used for the same.











SOLUTION: Diffraction grating patterns are formed on a double refractive plate exclusive of the desired region disposed at nearly its central part. These diffraction grating patterns consist of ion exchange regions 13 which are periodically formed by having a prescribed width and length and a prescribed thickness in a incident optical axis direction and dielectric films 14 which are formed atop these ion exchange regions. The thickness $d_{(sub\ 2)}$ of the ion exchange regions 13 and the film thickness $d_{(sub\ 3)}$ of the dielectric films 14 are so set that the ordinary rays to the double refractive plate transmit the diffraction grating patterns and the zero order diffracted waves of extraordinary rays are shut off by the diffraction grating patterns.



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| DOC TYPE | VIEW ISSUE TOC | VIEW FULL PAGE | VIEW CITATION |
|----------|---|---|---|
| CNF |  |  | <u>CVD photoresist processes for sub-0.18 design rules</u> Weidman, T.; Sugiarto, D.; Nault, M.; Mui, D.; Osborne, Z.; Lee, C.; Yang, J. VLSI Technology, 1998. Digest of Technical Papers. 1998 Symposium on, 1998, Page(s): 166 -167 |
| CNF |  |  | <u>A highly reliable self-planarizing low-k intermetal dielectric for sub-quarter micron interconnects</u> Matsuura, M.; Tottori, I.; Goto, K.; Maekawa, K.; Mashiko, Y.; Hirayama, M. Electron Devices Meeting, 1997. Technical Digest., International, 1997, Page(s): 785 -788 |
| CNF |  |  | <u>Low temperature MOCVD growth of V/VI materials via a Me/sub 3/SiNMe/sub 2/ elimination reaction</u> Groshens, T.J.; Gedridge, R.W., Jr.; Scher, R.; Cole, T. Thermoelectrics, 1996., Fifteenth International Conference on, 1996, Page(s): 430 -434 |
| PER |  |  | <u>Narrow-linewidth 1.3 mu m DFB-DCPBH lasers with lambda /4-shifted first-order gratings fabricated by electron beam lithography using a new fast resist</u> Zah, C.E.; Caneau, C.; Menocal, S.G.; Lin, P.S.D.; Gozdz, A.S.; Favire, F.; Lee, T.P. Electronics Letters Volume: 24 2, 21 Jan. 1988, Page(s): 94 -96 |
| PER |  |  | <u>SiC/Si heterojunction diodes fabricated by self-selective and by blanket rapid thermal chemical vapor deposition</u> Yih, P.H.; Li, J.P.; Steckl, A.J. Electron Devices, IEEE Transactions on Volume: 41 3, March 1994, Page(s): 281 -287 |

| | L # | Hits | Search Text | DBs | Time Stamp |
|---|-----|-------|----------------------------|-----------------|------------------|
| 1 | L1 | 36836 | DIELECTRIC ADJ (CONSTANT!) | USPAT; EPO; JPO | 2000/07/20 12:33 |
| 2 | L5 | 666 | methylsilane | USPAT; EPO; JPO | 2000/07/20 12:33 |
| 3 | L9 | 11 | trimethylsilane | USPAT; EPO; JPO | 2000/07/20 12:33 |
| 4 | L13 | 28 | (5 or 9) and 1 | USPAT; EPO; JPO | 2000/07/20 12:34 |

7/20/00 EK

| | L # | Hits | S arch Text | DE | Time Stamp |
|----|-----|---------|--|-----------------|------------------|
| 1 | L1 | 36836 | dielectric adj constant! | USPAT; EPO; JPO | 2000/07/19 15:03 |
| 2 | L5 | 388641 | methy | USPAT; EPO; JPO | 2000/07/19 15:03 |
| 3 | L9 | 107343 | "ch.sub.3" | USPAT; EPO; JPO | 2000/07/19 15:04 |
| 4 | L13 | 10130 | (5 or 9) with (silicon or "SiO.sub.2") | USPAT; EPO; JPO | 2000/07/19 15:07 |
| 5 | L17 | 12 | 1 with 13 | USPAT; EPO; JPO | 2000/07/19 15:46 |
| 6 | L21 | 1861621 | remov\$3 | USPAT; EPO; JPO | 2000/07/19 15:48 |
| 7 | L25 | 8180 | oxygen near3 (plasma not blood) | USPAT; EPO; JPO | 2000/07/19 15:49 |
| 8 | L29 | 2525 | 21 with 25 | USPAT; EPO; JPO | 2000/07/19 15:50 |
| 9 | L37 | 156 | (29 WITH carbon) | USPAT; EPO; JPO | 2000/07/19 15:55 |
| 10 | L33 | 15 | 29 with (5 or 9) | USPAT; EPO; JPO | 2000/07/19 15:51 |
| 11 | L41 | 303 | (29 WITH (organic or organo)) | USPAT; EPO; JPO | 2000/07/19 15:56 |
| 12 | L45 | 32 | (37 or 41) and 1 | USPAT; EPO; JPO | 2000/07/19 18:45 |
| 13 | L49 | 1947 | reduc\$4 near4 1 | USPAT; EPO; JPO | 2000/07/19 18:46 |
| 14 | L53 | 2509 | lower near4 1 | USPAT; EPO; JPO | 2000/07/19 18:48 |
| 15 | L61 | 5 | (49 same 25) | USPAT; EPO; JPO | 2000/07/19 18:48 |
| 16 | L57 | 62 | 49 and 25 | USPAT; EPO; JPO | 2000/07/19 18:55 |

EK 7/19/00

| | L # | Hits | Search Text | JBs | Time Stamp |
|----|------|--------|---|-----------------|------------------|
| 1 | L1 | 530 | alkylsilane | USPAT; EPO; JPO | 2000/07/20 14:54 |
| 2 | L5 | 4302 | organosilane | USPAT; EPO; JPO | 2000/07/20 14:54 |
| 3 | L9 | 1180 | organic adj silane | USPAT; EPO; JPO | 2000/07/20 14:54 |
| 4 | L13 | 685 | organo adj silane | USPAT; EPO; JPO | 2000/07/20 14:55 |
| 5 | L17 | 5930 | 5 or 9 or 13 | USPAT; EPO; JPO | 2000/07/20 15:01 |
| 6 | L21 | 596 | IMD | USPAT; EPO; JPO | 2000/07/20 15:01 |
| 7 | L25 | 1245 | ILD | USPAT; EPO; JPO | 2000/07/20 15:01 |
| 8 | L29 | 2560 | (interlayer or interlevel or intermetal) adj dielectric | USPAT; EPO; JPO | 2000/07/20 15:02 |
| 9 | L33 | 3888 | 21 or 25 or 29 | USPAT; EPO; JPO | 2000/07/20 15:03 |
| 10 | L37 | 30 | 17 and 33 | USPAT; EPO; JPO | 2000/07/20 15:03 |
| 11 | L41 | 28 | (1 AND 33) | USPAT; EPO; JPO | 2000/07/20 15:03 |
| 12 | L45 | 55 | 37 or 41 | USPAT; EPO; JPO | 2000/07/20 15:20 |
| 13 | L49 | 125369 | plasma not blood | USPAT; EPO; JPO | 2000/07/20 15:20 |
| 14 | L53 | 378169 | oxygen | USPAT; EPO; JPO | 2000/07/20 15:20 |
| 15 | L57 | 5404 | nitrous adj oxide | USPAT; EPO; JPO | 2000/07/20 15:20 |
| 16 | L61 | 34593 | ozone | USPAT; EPO; JPO | 2000/07/20 15:21 |
| 17 | L65 | 4744 | nitric adj oxide | USPAT; EPO; JPO | 2000/07/20 15:21 |
| 18 | L69 | 13022 | 49 with (53 or 57 or 61 or 65) | USPAT; EPO; JPO | 2000/07/20 15:22 |
| 19 | L73 | 76642 | "O.sub.2" | USPAT; EPO; JPO | 2000/07/20 15:22 |
| 20 | L77 | 94994 | "O.sub.3" | USPAT; EPO; JPO | 2000/07/20 15:22 |
| 21 | L81 | 5596 | "N.sub.2" adj O | USPAT; EPO; JPO | 2000/07/20 15:22 |
| 22 | L85 | 3853 | (49 WITH (73 or 77 or 81)) | USPAT; EPO; JPO | 2000/07/20 15:23 |
| 23 | L89 | 15170 | 69 or 85 | USPAT; EPO; JPO | 2000/07/20 15:23 |
| 24 | L97 | 251 | 89 and 17 | USPAT; EPO; JPO | 2000/07/20 15:24 |
| 25 | L93 | 26 | 89 and 1 | USPAT; EPO; JPO | 2000/07/20 15:37 |
| 26 | L101 | 36836 | dielectric adj constant! | USPAT; EPO; JPO | 2000/07/20 15:38 |
| 27 | L105 | 52 | (93 or 97) and 101 | USPAT; EPO; JPO | 2000/07/20 16:45 |
| 28 | L109 | 4189 | (reduc\$3 or lower\$2) near5 101 | USPAT; EPO; JPO | 2000/07/20 16:53 |
| 29 | L113 | 45 | 49 with 109 | USPAT; EPO; JPO | 2000/07/20 17:15 |